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DRINKING WATER SURVEILLANCE PROGRAM

**METRO TORONTO
(R.L. CLARK)
WATER TREATMENT
PLANT**

REPORT FOR 1991 AND 1992

ISSN 0839-8976

METRO TORONTO (R.L. CLARK) WATER TREATMENT PLANT
DRINKING WATER SURVEILLANCE PROGRAM
REPORT FOR 1991 AND 1992

MARCH 1994



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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

METRO TORONTO (R. L. CLARK) WATER TREATMENT PLANT 1991 AND 1992 REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1991, 96 supplies and in 1992, 109 supplies were being monitored.

The Metro Toronto (R. L. Clark) water treatment plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, fluoridation and disinfection. Ammonia is used in the disinfection process to convert free chlorine to a combined (chloramine) residual and sulphur dioxide is used to remove the excess chlorine. This plant has a rated capacity of 659 x 1000 m³/day. The Metro Toronto (R. L. Clark) water treatment plant together with the other Metro plants serves a population of approximately 2,333,300.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

Table A is a summary of all results by group.

The health related guideline for lead was exceeded in two distribution system samples at one location. The District Officer was notified. Inadequate flushing may have contributed to the elevated lead level.

The presence of elevated lead in the flowing and standing samples at one distribution system site indicates that household taps should be flushed, until the coolest water temperature is obtained, before water is used for consumption. The concentration of lead and other metals can increase while the water is standing in the service line and home plumbing. The health related ODWO for lead is applied to the free flowing sample.

At three other houses served by the four Metro water plants, no elevated lead levels were found in the flowing or standing samples.

No other known health related guidelines were exceeded.

The Metro Toronto (R. L. Clark) water treatment plant, for the sample years 1991 and 1992, produced good quality water and this was maintained in the distribution system.

TABLE A
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

SUMMARY TABLE BY SCAN

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A "-" INDICATES THAT NO SAMPLE WAS TAKEN

SCAN	SITE		RAW		TREATED		LABURNHAM AVE		NORDIN AVE	
	TESTS	%POSITIVE	TESTS	%POSITIVE	TESTS	%POSITIVE	TESTS	%POSITIVE	TESTS	%POSITIVE
BACTERIOLOGICAL	30	23	76	10	0	0	7	3	42	7
CHEMISTRY (FIELD)	29	29	100	60	60	100	69	69	100	72
CHEMISTRY (LABORATORY)	236	212	89	239	185	77	294	270	91	294
METALS	240	78	32	240	70	29	322	137	42	322
CHLORODAROMATICS	126	0	0	126	0	0	84	1	1	98
CHLOROPHENOLS	6	0	0	6	0	0	-	-	-	-
PESTICIDES & PCB	297	0	0	296	0	0	134	0	0	156
PHENOLICS	10	1	10	10	1	10	-	-	-	-
POLYAROMATIC HYDROCARBONS	67	0	0	67	0	0	51	0	0	67
SPECIFIC PESTICIDES	15	0	0	15	0	0	-	-	-	1
VOLATILES	298	0	0	298	40	13	207	28	13	207
RADIONUCLIDES	14	4	28	14	4	28	-	-	-	-
TOTAL	1,368	347	1,381	360	1,168	508	1,224	495		

DRINKING WATER SURVEILLANCE PROGRAM

METRO TORONTO (R. L. CLARK) WATER TREATMENT PLANT 1991 AND 1992 REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1991, 96 supplies and in 1992, 109 supplies were being monitored.

Appendix A has a full description of the DWSP.

The DWSP was initiated for the Metro Toronto (R. L. Clark) water treatment plant in the spring of 1986. Previous annual reports have been published for 1986, 1987, 1988, 1989 and 1990.

PLANT DESCRIPTION

The Metro Toronto (R. L. Clark) water treatment plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, fluoridation and disinfection. Ammonia is used in the disinfection process to convert free chlorine to a combined (chloramine) residual and sulphur dioxide is used to remove the excess chlorine. This plant has a rated capacity of $659 \times 1000 \text{ m}^3/\text{day}$. The Metro Toronto (R. L. Clark) water treatment plant together with the other Metro plants serves a population of approximately 2,333,300.

The sample day flows ranged from $144 \times 1000 \text{ m}^3/\text{day}$ to $425 \times 1000 \text{ m}^3/\text{day}$.

General plant information is presented in Table 1 and a schematic of plant processes, chemical addition points and sampling locations in Figure 1.

SAMPLING AND ANALYSES

Stringent DWSP sampling protocols were followed to ensure that all samples were collected in a uniform manner (see Appendix B).

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. Retention time was calculated by dividing the volume of water between two sampling points by sample day flow. For example, if it was determined that retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

To obtain a representative raw water sample, free from any added chemicals, at plants which used chlorine for zebra mussel control, the operator was required to turn off the chlorine feed to the mouth of the intake and allow enough time for the chlorinated water to clear from the intake works.

Plant operating personnel routinely analyzed parameters for process control (Table 2).

At all distribution system locations, two types of samples were obtained, a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples were used to make an assessment of the change in the levels of inorganic compounds and metals due to leaching from, or deposition on, the plumbing system. The only analyses carried out on the standing samples, therefore, were laboratory chemistry and metals. The free flow sample represented fresh water from the distribution system main, since the sample tap was flushed for five minutes prior to sampling.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP database as submitted by plant personnel.

Table 3 contains information on delay time between the raw and treated water sampling, flow rate, and treatment chemicals dosages.

Table 4 is a summary of all results by parameter and by water type. If a parameter was not detected, the total number of negative sample results is given. In contrast, if a parameter was detected at any location, the detailed results for all samples are provided.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment and Energy laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on Tables 4 and 5. Parameters are listed alphabetically within each scan.

DISCUSSION

GENERAL

Water quality was judged by comparison with the Ontario Drinking Water Objectives publication (ODWOs). These objectives are applied to free flowing water. When an Ontario Drinking Water Objective (ODWO) was not available, guidelines/limits from other agencies were used. These guidelines were obtained from the Parameter Listing System database.

The guidelines are evaluated on the results from the free flowing samples. Standing samples in the distribution system can show elevated concentrations in certain metals if the water is corrosive or if the standing time is excessive. Flushing the tap until the water achieves the coolest temperature will ensure that the water used for consumption will contain minimum concentrations of metals.

IN THIS REPORT, DISCUSSION IS LIMITED TO:

- THE TREATED AND DISTRIBUTED WATER;
- ONLY THOSE PARAMETERS WITH CONCENTRATIONS ABOVE
GUIDELINE VALUES; AND
- POSITIVE ORGANIC PARAMETERS DETECTED.

BACTERIOLOGICAL

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. Routine monitoring programs usually require that multiple samples be collected in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Standard plate count was the only bacteriological analysis conducted on the treated and distributed water. No results were above the guideline.

INORGANIC & PHYSICAL

CHEMISTRY (FIELD)

It is desirable that the temperature of drinking water be less than 15°C. The palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of delivered water may increase in the distribution system due to the warming effect of soil in late summer and fall and/or as a result of higher temperatures in the source water.

Field temperature exceeded the ODWO Aesthetic Objective of 15°C in 2 of 24 treated and distributed water samples with a maximum reported value of 21.5°C.

CHEMISTRY (LABORATORY)

The ODWOs indicate that a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters provides an acceptable balance between corrosion and encrustation. Water supplies with a hardness greater than 200 mg/L are considered poor and possess a tendency to form scale deposits and result in excessive soap consumption.

Hardness exceeded the ODWO Recommended Operational Guideline of 80-100 mg/L in all 24 treated and distributed water samples with a maximum reported value of 144 mg/L.

Ammonia is used in the disinfection process to convert free chlorine residual into a combined chlorine (chloramine), therefore the presence of slightly elevated ammonia levels in the treated and distributed water are expected.

The European Economic Community has an Aesthetic Guideline Level of 0.05 mg/L for total ammonium.

Total ammonium exceeded the European Economic Community Aesthetic Guideline Level of 0.05 mg/L in 14 of 24 treated and distributed water samples with a maximum reported value of 0.098 mg/L.

METALS

At present, there is no evidence that aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of aluminum in treated water is important to measure the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as aluminum in the water leaving the plant to avoid problems in the distribution system.

Aluminum exceeded the ODWO Recommended Operational Guideline of 100 ug/L in 5 of 24 treated and distributed water samples with a maximum reported value of 290 ug/L.

Lead exceeded the ODWO Maximum Acceptable Concentration of 10 ug/L in 2 of 24 treated and distributed water samples with a maximum reported value of 14.0 ug/L. The District Officer was notified. Inadequate flushing may have contributed to the elevated lead level.

The presence of elevated lead in the flowing and standing samples at one distribution system site indicates that household taps should be flushed, until the coolest water temperature is obtained, before water is used for consumption. The concentration of lead and other metals can increase while the water is standing in the service line and home plumbing. The health related ODWO for lead is applied to the free flowing sample.

At three other houses served by the four Metro water plants, no elevated lead levels were found in the flowing or standing samples.

ORGANIC

CHLOROAROMATICS

Hexachloroethane was found at positive levels in 2 of the 22 treated and distributed water samples analyzed. The maximum observed level was 36.0 ng/L. This was below the United States Environmental Protection Agency Ambient Water Quality Criteria of 1,900 ng/L.

CHLOROPHENOLS

The results of the chlorophenol scan showed that none were detected.

PESTICIDES and PCB

The results of the pesticide and PCB scan showed that none were detected above trace levels.

PHENOLICS

Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes. The ODWOs have been revised to replace the aesthetic phenolic objective with objectives for specific phenols.

Phenolics were found at a positive level in 1 of the 10 treated and distributed water samples analyzed. The maximum observed level was 1.2 ug/L.

POLYAROMATIC HYDROCARBONS

The results of the polyaromatic hydrocarbon scan showed that none were detected.

SPECIFIC PESTICIDES

The results of the specific pesticide scan showed that none were detected.

VOLATILES

The detection of benzene, ethylbenzene, toluene and xylenes at low, trace levels may be a laboratory artifact derived from the analytical methodology. Trace levels of styrene are considered to be laboratory artifacts resulting from the sample shipping containers.

Trihalomethanes (THMs) are produced during the water treatment process and will always occur in chlorinated waters. THMs are comprised of chloroform, chlorodibromomethane and dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs. Only total THM results are discussed. Starting in 1991, samples from the distribution system were quenched with sodium thiosulphate to stop the further production of THMs in the sample bottle. This provided a more representative estimation of the THMs consumed in tap water.

Total trihalomethanes were found at positive levels in all 24 treated and distributed water samples analyzed with a maximum level of 37.1 ug/L. This was below the ODWO Maximum Acceptable Concentration of 350 ug/L.

RADIOLOGICAL

RADIONUCLIDES

There are more than 200 radionuclides, some of which occur naturally and others which originate from the activities of society. The radionuclides currently of greater interest from a health view-point are tritium, strontium-90, iodine-131, cesium-137 and radium-226. The gross beta and gross alpha determinations are suitable for preliminary screening except for tritium which must be measured separately. Radionuclides are measured in becquerels per litre (Bq/L). No results were above the available guidelines.

CONCLUSIONS

The health related guideline for lead was exceeded in two distribution system samples at one location. The District Officer was notified. Inadequate flushing may have contributed to the elevated lead levels.

The presence of elevated lead in the flowing and standing samples at one distribution system site indicates that household taps should be flushed, until the coolest water temperature is obtained, before water is used for consumption. The concentration of lead and other metals can increase while the water is standing in the service line and home plumbing. The health related ODWO for lead is applied to the free flowing sample.

At three other houses served by the four Metro water plants, no elevated lead levels were found in the flowing or standing samples.

No other known health related guidelines were exceeded.

The Metro Toronto (R. L. Clark) water treatment plant, for the sample years 1991 and 1992, produced good quality water and this was maintained in the distribution system.

FIGURE 1
METRO TORONTO (R.L. CLARK) WATER TREATMENT PLANT

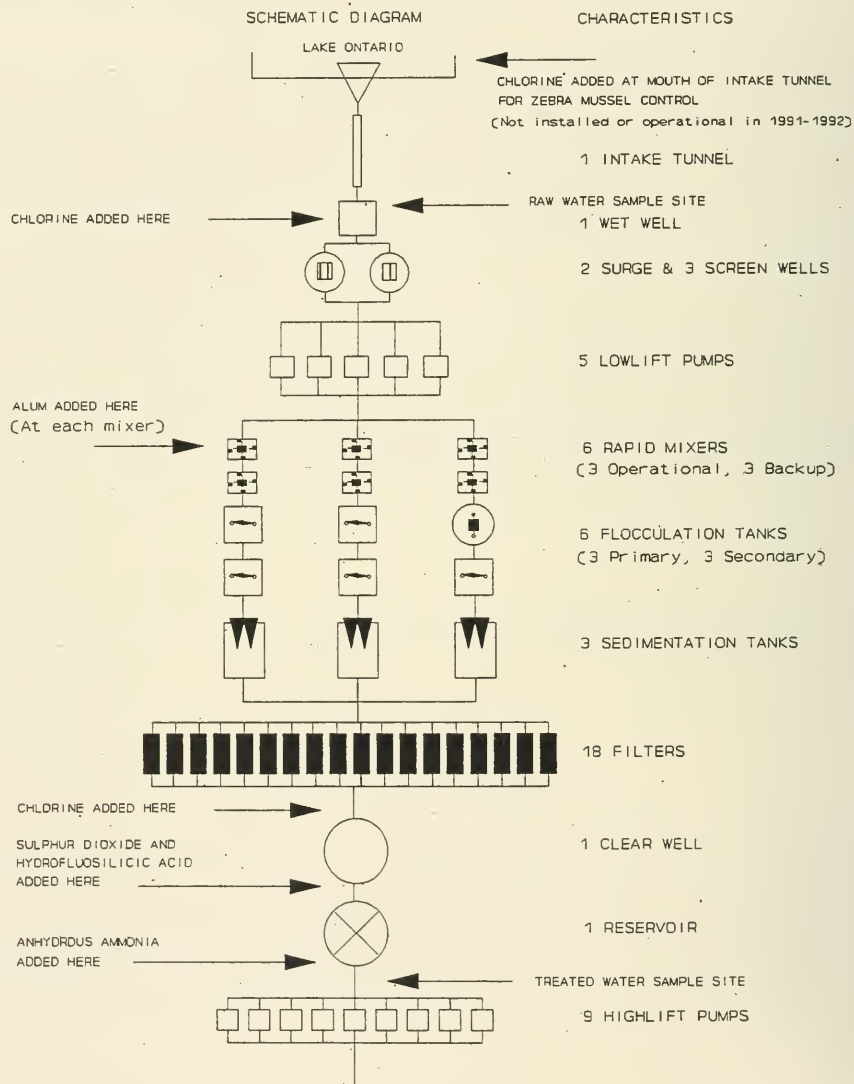


TABLE 1
DRINKING WATER SURVEILLANCE PROGRAM
PLANT GENERAL REPORT

PLANT NAME: METRO TORONTO (R. L. CLARK) WTP
WORKS #: 220002253
UTM #: 176205404826460

DISTRICT: TORONTO
REGION: CENTRAL
DISTRICT OFFICER: J. RICHARDSON

SUPERINTENDENT: R.R. MALKIEWICZ

ADDRESS: 45 23RD ST.
TORONTO, ONTARIO
M8V3M6
416-392-2905

MUNICIPALITY: METRO TORONTO
AUTHORITY: MUNICIPAL

PLANT INFORMATION

PLANT VOLUME:	154.880	(X 1000 M3)
DESIGN CAPACITY:	455.000	(X 1000 M3/DAY)
RATED CAPACITY:	659.000	(X 1000 M3/DAY)

MUNICIPALITY	POPULATION
-----	-----
BOROUGH OF EAST YORK	97,679
CITY OF TORONTO	615,000
CITY OF YORK	133,856
CITY OF ETOBICOKE	298,490
CITY OF NORTH YORK	556,308
REGION OF YORK (SOUTH)	170,000
CITY OF SCARBOROUGH	461,957

TABLE 2
DRINKING WATER SURVEILLANCE PROGRAM
IN-PLANT MONITORING

PARAMETER -----	LOCATION -----	FREQUENCY -----
ALUMINUM	LAB RAW LAB TREATED	WEEKLY DAILY
FREE CHLORINE RESIDUAL	CHLORINATED FILTERS (INDIVIDUAL) FILTERED BEFORE SO2 AFTER SO2	CONTINUOUS CONTINUOUS CONTINUOUS CONTINUOUS CONTINUOUS
COLOUR	LAB RAW LAB FILTERED LAB TREATED	DAILY DAILY DAILY
TOTAL CHLORINE RESIDUAL	TREATED	CONTINUOUS
FLUORIDE	LAB TREATED LAB TREATED COMPOSITE	EVERY 4 HOURS HOURLY
AMMONIA TEST	LAB RAW LAB SETTLED LAB BEFORE SO2 LAB TREATED	EVERY 2 HOURS EVERY 2 HOURS EVERY 8 HOURS EVERY 8 HOURS
PH	RAW	CONTINUOUS
TASTE & ODOUR	LAB TREATED LAB FILTERED	HOURLY HOURLY
TEMPERATURE	RAW	CONTINUOUS
TURBIDITY	RAW FILTERED SETTLED TREATED	CONTINUOUS CONTINUOUS CONTINUOUS CONTINUOUS

TABLE 3
DRINKING WATER SURVEILLANCE PROGRAM METRO TORONTO (R. L. CLARK) WTP SAMPLE DAY CONDITIONS
AND TREATMENT CHEMICAL DOSAGES FOR 1991 AND 1992

DATE	DELAY * TIME(HRS)	FLOW (1000M3)	PRE CHLORINATION CHLORINE	COAGULATION ALUM LIQUID	POST CHLORINATION CHLORINE	FLUORIDATION HYDROFLUOSILICIC ACID	DECHLORINATION SULPHUR DIOXIDE	CHLORINATION AMMONIA
1 FEB 19	11.90	312.000	.80	4.00	1.30	.98	1.00	.20
1 APR 16	15.49	296.000	.80	3.00	1.70	.95	1.00	.20
1 JUN 18	8.45	405.000	.80	7.00	1.80	1.09	1.00	.20
1 AUG 20	9.07	414.000	.80	3.00	1.70	1.03	1.10	.20
1 OCT 22	9.91	375.000	.80	3.00	.70	1.03	.25	.20
1 NOV 19	9.78	425.000	.80	3.00	.80	1.08	.40	.20
2 FEB 18	9.07	385.000	1.50	3.00	1.00	1.04	1.10	.20
2 MAY 20	9.99	399.000	1.50	3.00	1.70	1.14	1.00	.20
2 AUG 18	6.59	568.000	.80	7.00	1.80	.99	.70	.20
2 NOV 17	24.78	144.000	1.50	15.00	2.10	.99	1.50	.20

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

KEY TO TABLE 4 and 5

- A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
 - 1+. MAC for Total Trihalomethanes
 2. Interim Maximum Acceptable Concentration (IMAC)
 3. Aesthetic Objective (AO)
 - 3*. AO for Total Xylenes
 4. Recommended Operational Guideline
 5. Health Related Guidance Value
- B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
 2. Proposed MAC
 3. Interim MAC
 4. Aesthetic Objective (AO)
- C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
 2. Tentative GV
 3. Aesthetic GV
- D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
 2. Suggested No-Adverse Effect Level (SNAEL)
 3. Lifetime Health Advisory
 4. EPA Ambient Water Quality Criteria
- F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
 2. Aesthetic Guideline Level
 3. Maximum Admissable Concentration (MADC)
- G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- I NEW YORK STATE AMBIENT WATER GUIDELINE
- N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

. No Sample Taken

BDL Below Minimum Measurement Amount

<T Greater Than Detection Limit But Not Confident
(SEE INTERPRETATION OF RESULTS ABOVE)

> Results Are Greater Than The Upper Limit

<=> Approximate Result

!48 No Data: Sample Age Exceeded 48 Hours

!AR No Data: No Numeric Results

!AW No Data: Analysis Withdrawn

!BT No Data: Sample Broken In Transit

!CS No Data: Contamination Suspected

!EF No Data: Laboratory Equipment Failure

!IR No Data: Insufficient Sample

!IS No Data: Insufficient Sample

!LA No Data: Laboratory Accident

!NP No Data: No Procedure

!NR No Data: Sample Not Received

!OP No Data: Obscured Plate

!PE No Data: Procedure Error: Sample Discarded

!PR No Data: Preservative Required

!QU No Data: Quality Control Unacceptable

!RE No Data: Received Empty

!RO No Data: No Numeric Results

!SM No Data: Sample Missing

!SS No Data: Sample Improperly Preserved

!U No Data: Sample Unsuitable For Analysis

!UB No Data: Bottle Broken.

!UN No Data: Result Unreliable

!UR	No Data: Unpreserved Sample Required
A	Approximate Value
A3C	Approximate, Total Count Exceeded 300 Colonies
A>	Approximate Value, Exceeded Normal Range
APS	Additional Peak, Less Than, Not Priority Pollutant
ARO	Additional Information In Laboratory Report
CRO	Calculated Result Only
NAF	Not All Required Tests Found
RID	Ioncal Calculated on Incomplete Data Set
RMP	P and M-Xylene Not Separated
RRR	Result Obtained by Repeat Analysis
RRV	Rerun Verification
SFA	Sample Filtered: Filtrate Analyzed
SIL	Sample Incorrectly Labelled
SPS	Several Peaks, Small, Not Priority Pollutant
U48	Unreliable: Sample Age Exceeded 48 Hours
UAL	Unreliable: Sample Age Exceeded Limit
UAU	Unreliable: Sample Age Unknown
UCS	Unreliable: Contamination Suspected
WSD	Wrong Sample Description On Bottle

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
BACTERIOLOGICAL					
FECAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 0 (A1)	
1991 FEB	0				
1991 APR	12				
1991 JUN	1				
1991 AUG	6				
1991 OCT	70				
1991 NOV	8				
1992 FEB	80L				
1992 MAY	80L				
1992 AUG	5				
1992 NOV	122				
STANDARD PLATE CNT MF (CT/ML)		DET'N LIMIT = 0		GUIDELINE = 500 (A3)	
1991 FEB		3 <=>			3 <=>
1991 APR		2 <=>			0 <=>
1991 JUN		1 <=>	1 <=>		0 <=>
1991 AUG		8 <=>	55		
1991 OCT		5 <=>	380		
1991 NOV		1 <=>	145		7 <=>
1992 FEB		0 <=>	0 <=>		5 <=>
1992 MAY		7 <=>	0		1 <=>
1992 AUG		4 <=>	0 <=>		
1992 NOV		0 <=>	3 <=>		6 <=>
TOTAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 5/100ML (A1)	
1991 FEB	20 <=>				
1991 APR	194				
1991 JUN	48 A3C				
1991 AUG	60 A3C				
1991 OCT	568 A3C				
1991 NOV	10 <=>				
1992 FEB	10 <=>				
1992 MAY	16 A3C				
1992 AUG	36 A3C				
1992 NOV	1700 A3C				

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DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
BACTERIOLOGICAL					
T COLIFORM BCKGRD MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = N/A	
1991 FEB	120	.	.	.	.
1991 APR	920	.	.	.	.
1991 JUN	1980 A3C	.	.	.	.
1991 AUG	1680 A3C	.	.	.	.
1991 OCT	4000 A3C	.	.	.	.
1991 NOV	70 <=>	.	.	.	.
1992 FEB	180	.	.	.	.
1992 MAY	2200 A3C	.	.	.	.
1992 AUG	9600 >	.	.	.	.
1992 NOV	50000 A3C	.	.	.	.

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DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NOROIN AVE FREE FLOW	DIST. SYSTEM NOROIN AVE STANDING
CHEMISTRY (FIELD)					
FLD CHLORINE (COMB) (MG/L)		DET'N LIMIT = 0		GUIDELINE = N/A	
1991 FEB	.700			.600	.400
1991 APR	.600	.550	.300	.500	.300
1991 JUN	.650	.600	.500	.500	.300
1991 AUG	.200	.500	.500		
1991 OCT	.200	.400	.400	.400	.300
1991 NOV	.650	.400	.400	.400	.300
1992 FEB	.710			.600	.600
1992 MAY	.800	.200	.200		
1992 AUG	.800			.300	.300
1992 NOV	.660	.200	.200		
FLD CHLORINE FREE (MG/L)		DET'N LIMIT = 0		GUIDELINE = N/A	
1991 FEB	.100			.200	.100
1991 APR	.100	.100	.100	.100	.100
1991 JUN	.100	.200	.200	.100	.100
1991 AUG	.500	.300	.300		
1991 OCT	.550	.200	.100	.200	.100
1991 NOV	.100	.200	.200	.300	.100
1992 FEB	.090			.400	.200
1992 MAY	.100	.200	.200		
1992 AUG	.200			.200	.100
1992 NOV	.340	.200	.200		
FLD CHLORINE (TOTAL) (MG/L)		DET'N LIMIT = 0		GUIDELINE = N/A	
1991 FEB	.800			.800	.500
1991 APR	.700	.650	.400	.600	.400
1991 JUN	.750	.800	.700	.600	.400
1991 AUG	.700	.800	.800		
1991 OCT	.750	.600	.600	.600	.400
1991 NOV	.750	.600	.600	.700	.400
1992 FEB	.800			.800	.800
1992 MAY	.900	.400	.400		
1992 AUG	1.000			.500	.400
1992 NOV	1.000	.400	.400		

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DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
CHEMISTRY (FIELD)					
FLD PH (OHNSLESS)		DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5 (A4)		
1991 FEB	8.100	7.450		7.400	7.400
1991 APR	8.400	7.500	7.300	7.300	7.400
1991 JUN	8.100	7.300	7.400	7.000	7.000
1991 AUG	8.000	7.200	7.400		
1991 OCT	8.200	7.400		7.400	7.400
1991 NOV	8.100	7.400	7.200	7.200	7.200
1992 FEB	8.300	7.300		7.200	7.400
1992 MAY	8.400	7.500	7.200		
1992 AUG	8.600	7.500			
1992 NOV	8.400	7.400	7.400	7.200	7.400
FLD TEMPERATURE (DEG.C)					
		DET'N LIMIT = N/A	GUIDELINE = 15 (A3)		
1991 FEB	1.500	3.000		5.000	15.000
1991 APR	4.100	4.900	10.000	6.000	13.000
1991 JUN	6.200	6.700	20.000	10.000	20.000
1991 AUG	8.700	9.200	21.500		
1991 OCT	7.700	7.700	20.000	12.000	20.000
1991 NOV	6.100	6.200	15.100	10.000	20.000
1992 FEB	1.600	3.400		4.000	16.000
1992 MAY	8.000	8.700	19.000		
1992 AUG	16.400	17.000	12.000	15.000	18.000
1992 NOV		7.500			
FLD TURBIDITY (FTU)					
		DET'N LIMIT = N/A	GUIDELINE = 1.0 (A1)		
1991 FEB	1.000			.200	.200
1991 APR	3.400				
1991 JUN	.800				
1991 AUG	.800				
1991 OCT	.600				
1991 NOV	.700				
1992 FEB	.600				
1992 MAY	.900				
1992 AUG	1.800				
1992 NOV	10.000				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

CHEMISTRY (LABORATORY)									
ALKALINITY (MG/L)		DET'N LIMIT = 0.2		GUIDELINE = 30-500 (A4)					
1991 FEB	102.500	93.100		94.600	93.100	93.500			
1991 APR	104.700	95.400		94.800	97.300	96.600			
1991 JUN	103.300	92.300		92.400	93.200	93.500			
1991 AUG	101.200	92.200		92.600					
1991 OCT	101.100	94.600		95.400	95.600	95.800			
1991 NOV	99.700	93.500		93.400	93.700	94.000			
1992 FEB	101.000	90.900			92.200	93.400			
1992 MAY	100.800	91.600		91.700					
1992 AUG	98.000	88.300			88.800	89.000			
1992 NOV	105.300	84.000		93.400					
CALCIUM (MG/L)		DET'N LIMIT = 0.20		GUIDELINE = 100 (F2)					
1991 FEB	42.600	43.100		41.800	41.800	42.600			
1991 APR	41.400	41.800		41.600	42.400	41.600			
1991 JUN	40.000	39.800		39.800	40.200	41.000			
1991 AUG	39.600	39.800		40.600					
1991 OCT	39.600	39.800		39.900	41.200	40.400			
1991 NOV	39.400	39.800		39.700	38.800	39.500			
1992 FEB	36.200	36.500		40.000	36.600	36.800			
1992 MAY	39.200	39.200		38.400	38.300	38.200			
1992 AUG	37.750	37.500			38.350				
1992 NOV	39.600	40.600		39.400	40.400				
CYANIDE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 0.2 (A1)					
16 SAMPLES	BDL	BDL							
CHLORIDE (MG/L)		DET'N LIMIT = 0.20		GUIDELINE = 250 (A3)					
1991 FEB	28.200	32.400		27.400	28.100	29.800			
1991 APR	25.100	27.000		27.500	27.100	27.600			
1991 JUN	22.800	25.300		25.500	25.300	25.500			
1991 AUG	22.800	25.100		25.600	25.200				
1991 OCT	22.200	23.900		23.700	23.500	24.000			
1991 NOV	22.500	24.200		24.200	23.700	24.000			
1992 FEB	23.500	26.600			23.800	24.100			
1992 MAY	22.800	25.900		26.300	25.900	26.100			
1992 AUG	21.700	24.800		26.500					
1992 NOV	24.600	27.300		25.500	24.900	24.900			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

COLOUR (HZU)	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	CHEMISTRY (LABORATORY)	DIST. SYSTEM LABURNHAM AVE		DIST. SYSTEM LABURNHAM AVE		DIST. SYSTEM NORDIN AVE		DIST. SYSTEM NORDIN AVE	
				FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
				DET'N LIMIT = 0.50				GUIDELINE = 5 (A3)			
1991 FEB	1,000 <T	.500 <T		1,500 <T	1,500 <T	1,500 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
1991 APR	1,000 <T	1,000 <T		1,000 <T	2,000	1,500 <T	1,000 <T	1,500 <T	1,000 <T	2,500	
1991 JUN	1,500	1,000 <T		1,000 <T	3,000	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
1991 AUG	2,000	1,000 <T		1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
1991 OCT	2,000	1,000		1,000 <T	1,500	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
1991 NOV	1,000	1,000		1,000 <T	1,500	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
1992 FEB	1,000	1,000		1,000 <T	1,500	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
1992 MAY	1,500	.500 <T		1,000 <T	1,500	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
1992 AUG	2,000	BOL		2,000	1,500	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
1992 NOV	4,000	1,500		2,000	1,500	1,000 <T	1,000 <T	1,000 <T	1,000 <T	1,000 <T	
				DET'N LIMIT = 1.0				GUIDELINE = 400 (F2)			
1991 FEB	339	348		342	341	333	340	333	340	340	
1991 APR	339	341		333	335	338	343	338	343	343	
1991 JUN	328	333		324	324	323	325	323	325	334	
1991 AUG	317	322		324	323	321	323	323	321	325	
1991 OCT	321	324		322	323	321	323	323	321	323	
1991 NOV	318	323		322	323	321	323	323	321	323	
1992 FEB	331	327		323	323	336	337	336	337	337	
1992 MAY	314	321		323	323	322	323	322	323	323	
1992 AUG	313	321		325	332	322	323	322	323	323	
1992 NOV	327	341		325	332	322	323	322	323	323	
				DET'N LIMIT = 0.10				GUIDELINE = 5.0 (A3)			
				DET'N LIMIT = 0.10				GUIDELINE = 5.0 (A3)			
1991 FEB	2,000	1,700		2,300	2,100	1,800	1,800	1,800	1,800	1,800	
1991 APR	2,400	2,100		1,600	1,900	1,700	2,100	1,700	2,100	2,100	
1991 JUN	1,700	1,600		1,400	1,800	1,600	1,600	1,600	1,600	1,600	
1991 AUG	1,700	1,500		1,700	1,800	1,700	1,800	1,700	1,800	1,800	
1991 OCT	1,800	2,000		1,700	1,800	1,700	1,800	1,700	1,800	1,800	
1991 NOV	1,700	1,800		1,700	1,800	1,500	1,800	1,500	1,800	1,800	
1992 FEB	1,500	1,500		1,800	2,100	1,500	2,100	1,500	2,100	2,100	
1992 MAY	1,700	1,900		1,800	1,800	1,800	1,800	1,800	1,800	1,900	
1992 AUG	2,000	1,900		1,500	1,800	1,800	1,800	1,800	1,800	1,900	
1992 NOV	2,000	1,600		1,500	1,800	1,800	1,800	1,800	1,800	1,900	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
CHEMISTRY (LABORATORY)					
FLUORIDE (MG/L)		DET'N LIMIT = 0.01	GUIDELINE = 1.5 (A1)		
1991 FEB	.140			1.100	1.080
1991 APR	.120	1.100	1.100	1.140	1.120
1991 JUN	.120	1.180	1.180	1.200	1.140
1991 AUG	.120	1.140	1.180		
1991 OCT	.060	1.160	1.100	1.120	1.080
1991 NOV	.120	1.140	1.160	1.180	1.200
1992 FEB	.120	1.100		1.040	1.100
1992 MAY	.140	1.160	1.180		
1992 AUG	.100	1.000	1.020	1.140	1.100
1992 NOV	.100				
HARDNESS (MG/L)		DET'N LIMIT = 0.5	GUIDELINE = 80-100 (A4)		
1991 FEB	141.900			139.500	142.200
1991 APR	140.000	141.000	139.000	142.000	140.000
1991 JUN	134.000	134.000	134.000	134.000	136.000
1991 AUG	134.000	136.000	131.000		
1991 OCT	134.100	134.800	130.500	138.400	135.500
1991 NOV	132.000	134.900	130.300	126.000	132.600
1992 FEB	126.000	134.200	132.000		127.000
1992 MAY	133.300		131.500	130.470	130.460
1992 AUG	129.310	128.710	137.000		
1992 NOV	136.000	134.000			
IONCAL (OMMSLESS)					
		DET'N LIMIT = N/A	GUIDELINE = N/A		
1991 FEB	2.025	4.805		2.973	3.505
1991 APR	.565 NAF	2.449 NAF	1.654 NAF	1.385 NAF	.340 NAF
1991 JUN	.704 NAF	1.800 NAF	1.501 NAF	1.342 NAF	2.092 NAF
1991 AUG	.699	.438	1.702		
1991 OCT	2.128	.326	3.712	1.938	.870
1991 NOV	1.660 NAF	.589 NAF	.388 NAF	.058 NAF	.256 NAF
1992 FEB	4.360	1.369		2.758	2.905
1992 MAY	.362	.799	2.127 NAF		
1992 AUG	.406	.049		1.250	.958
1992 NOV	1.320	1.398	1.388		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
CHEMISTRY (LABORATORY)					
POTASSIUM (MG/L)		DET'N LIMIT = 0.01		GUIDELINE = 10 (F2)	
1991 FEB	1.570	1.610		1.520	1.550
1991 APR	1.600	1.600	1.650	1.600	1.600
1991 JUN	1.500	1.500	1.600	1.550	1.600
1991 AUG	1.550	1.550	1.550		
1991 OCT	1.670	1.640	1.650	1.680	1.670
1991 NOV	1.410	1.380	1.420	1.380	1.370
1992 FEB	1.480	1.500		1.540	1.510
1992 MAY	1.570	1.540	1.540		
1992 AUG	1.524			1.548	1.564
1992 NOV	1.870	1.585	1.682		
LANGELIERS INDEX (OMNLESS)		DET'N LIMIT = N/A		GUIDELINE = N/A	
1991 FEB	.415	.147		.166	.205
1991 APR	.532	.355	.392	.381	.379
1991 JUN	.412	.031	.071	.181	.139
1991 AUG	.270	.129	.032	.053	
1991 OCT	.419	.282	.343	.365	.324
1991 NOV	.441	.317	.309	.311	.316
1992 FEB	.479	.347		.307	.391
1992 MAY	.534	.292	.357	.332	.198
1992 AUG	.626	.137		.149	
1992 NOV	.446	.058	.240	.332	
MAGNESIUM (MG/L)		DET'N LIMIT = 0.1		GUIDELINE = 30.0 (F2)	
1991 FEB	8.650	8.800		8.500	8.700
1991 APR	8.800	8.600		8.600	8.700
1991 JUN	8.200	8.100	8.800	8.300	8.100
1991 AUG	8.500	8.400	8.500	8.200	
1991 OCT	8.550	8.600	8.550		
1991 NOV	8.150	8.250	8.300	8.650	8.400
1992 FEB	8.530	8.520		8.150	8.250
1992 MAY	8.610	8.670	8.620	8.520	8.500
1992 AUG	8.520	8.510			
1992 NOV	9.030	9.080	8.610	8.440	8.510

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

CHEMISTRY (LABORATORY)					
SODIUM (MG/L)		DET'N LIMIT = 0.20		GUIDELINE = 200 (A4)	
1991 FEB	15.000	16.400		13.600	14.200
1991 APR	13.400	13.200	13.200	12.800	12.800
1991 JUN	13.800	13.800	13.400	13.200	13.200
1991 AUG	11.800	12.000	12.200		
1991 OCT	12.100	12.300	12.100	12.400	12.100
1991 NOV	11.900	11.900	12.000	11.900	11.800
1992 FEB	13.500	14.100	12.200	13.200	13.400
1992 MAY	12.500	12.500	12.300		
1992 AUG	12.090	12.140		11.910	12.130
1992 NOV	13.460	13.710	12.700		
AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002		GUIDELINE = 0.05 (F2)	
1991 FEB	.036	.058		.098	.074
1991 APR	.052	.082	.056	.064	.046
1991 JUN	.030	.064	.084	.084	.092
1991 AUG	.008 <T	.092	.094		
1991 OCT	.020	.004 <T	.008 <T	.010	.012
1991 NOV	.081	.084	.090	.088	.076
1992 FEB	.016	.054		.072	.070
1992 MAY	.026	.044	.080		
1992 AUG	.044	.008 <T		.008 <T	.012
1992 NOV	.026	.006 <T	.028		
NITRITE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.0 (A1)	
1991 FEB	.008	.001 <T		.001 <T	.003 <T
1991 APR	.005	.001 <T	.002 <T	.001 <T	.002 <T
1991 JUN	.009	.001 <T	.004 <T	.001 <T	.001 <T
1991 AUG	.009	.001 <T	.007		
1991 OCT	.006	.001 <T	.003 <T	.002 <T	.003 <T
1991 NOV	.003 <T	.001 <T	.009	.001 <T	.006
1992 FEB	.007	.001 <T		.001 <T	.001 <T
1992 MAY	.009	.002 <T	.008		
1992 AUG	.010	.002 <T		.002 <T	.001 <T
1992 NOV	.012	.001 <T	.002 <T		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
CHEMISTRY (LABORATORY)					
NITRATE (TOTAL) (MG/L)		DET'N LIMIT = 0.005		GUIDELINE = 10.0 (A1)	
1991 FEB	.435	.450		.410	.425
1991 APR	.395	.400	.415	.395	.425
1991 JUN	.390	.390	.410	.395	.395
1991 AUG	.375	.370	.360	.375	
1991 OCT	.440	.425	.400	.400	.410
1991 NOV	.405	.415	.395	.410	.410
1992 FEB	.415	.420		.420	.420
1992 MAY	.365	.365	.400		.205
1992 AUG	.205	.210	.400	.210	
1992 NOV	.430	.465	.370		
NITROGEN TOT KJELD (MG/L)					
		DET'N LIMIT = 0.02		GUIDELINE = N/A	
1991 FEB	.260	.210		.230	.240
1991 APR	.130	.240	.170	.230	.200
1991 JUN	.230	.250	.310	.280	.260
1991 AUG	.140	.190	.250		
1991 OCT	.230	.170	.180	.190	.200
1991 NOV	.180	.240	.320	.230	.240
1992 FEB	.190	.220		.240	.250
1992 MAY	.210	.230	.280		.240
1992 AUG	.330	.240		.230	
1992 NOV	.280	.160	.200		
PH (DIMENSIONLESS)					
		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)	
1991 FEB	8.220	7.990		8.020	8.050
1991 APR	8.340	8.200	8.230	8.200	8.220
1991 JUN	8.240	7.910	8.060	7.910	8.000
1991 AUG	8.110	7.750	7.940		
1991 OCT	8.260	8.150	8.230	8.190	8.180
1991 NOV	8.290	8.190	8.190	8.190	8.190
1992 FEB	8.360	8.270		8.270	8.300
1992 MAY	8.380	8.180	8.230		
1992 AUG	8.500	8.060	8.250	8.060	8.110
1992 NOV	8.270	7.970	8.120		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
CHEMISTRY (LABORATORY)					
SULPHATE (MG/L)		DET'N LIMIT = 0.20		GUIDELINE = 500 (A3)	
1991 FEB	28.160	31.680		30.770	30.990
1991 APR	27.270	30.490	31.890	31.150	30.760
1991 JUN	26.490	31.260	31.390	31.310	31.170
1991 AUG	26.810	31.470	31.220		
1991 OCT	30.720	32.920	33.820	32.570	32.830
1991 NOV	28.090	29.950	30.690	28.390	29.920
1992 FEB	26.810	29.920		30.170	29.760
1992 MAY	27.680	30.810	31.270		
1992 AUG	26.510	31.590	31.620	30.470	31.130
1992 NOV	27.280	42.770	32.590		
TURBIDITY (FTU)					
		DET'N LIMIT = 0.05		GUIDELINE = 1.0 (A1)	
1991 FEB	1.640 RRV	.250		.160	.500
1991 APR	4.100	.280	.390	.320	.350
1991 JUN	1.080	.140	.120	.130	.180
1991 AUG	.680	.090	.190		
1991 OCT	.320	BOL	.060 <T		
1991 NOV	.710	.170 <T	.620	.070 <T	.110 <T
1992 FEB	1.450	.070 <T	.290	.210 <T	.310
1992 MAY	.920	.280		.190 <T	.250
1992 AUG	1.430	.530	.290	.570	.700
1992 NOV	13.600	.980	.610		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

METALS				DET'N LIMIT = 0.05		GUIDELINE = N/A	
SILVER (UG/L)	BOL	BOL	BOL	BOL	BOL	BOL	BOL
48 SAMPLES							
ALUMINUM (UG/L)							
1991 FEB	18.000	72.000				61.000	64.000
1991 APR	51.000	96.000	88.000			83.000	83.000
1991 JUN	13.000	67.000	59.000			75.000	64.000
1991 AUG	9.400	59.000	39.000			84.000	
1991 OCT	8.400	97.000	87.000			84.000	110.000
1991 NOV	9.500	92.000	89.000			110.000	83.000
1992 FEB	11.000	77.000				69.000	99.000
1992 MAY	8.100	130.000	150.000				71.000
1992 AUG	14.000	290.000				260.000	
1992 NOV	150.000	97.000	120.000				260.000
ARSENIC (UG/L)							
1991 FEB	.790 <T	.650 <T				.380 <T	.460 <T
1991 APR	.560 <T	.330 <T	.320 <T			.230 <T	.380 <T
1991 JUN	.870 <T	.420 <T	.550 <T			.580 <T	.540 <T
1991 AUG	.950 <T	.680 <T	.770 <T			.880 <T	
1991 OCT	1.100	.820 <T	.800 <T			.830 <T	.810 <T
1991 NOV	.860 <T	.870 <T	.790 <T			.970 <T	.770 <T
1992 FEB	.900 <T	.820 <T	.870 <T			.850 <T	.850 <T
1992 MAY	.580 <T	1.000 <T	1.000 <T			.660 <T	.550 <T
1992 AUG	.830 <T	1.000 <T				.930 <T	1.200
1992 NOV	.820 <T	.440 <T	.610 <T				
BARIUM (UG/L)							
1991 FEB	22.000	22.000				22.000	23.000
1991 APR	24.000	23.000	23.000			22.000	24.000
1991 JUN	23.000	23.000	22.000			22.000	24.000
1991 AUG	23.000	23.000	23.000				
1991 OCT	22.000	22.000	21.000			22.000	23.000
1991 NOV	23.000	23.000	23.000			22.000	25.000
1992 FEB	24.000	22.000				22.000	24.000
1992 MAY	24.000	23.000	23.000			24.000	24.000
1992 AUG	24.000	24.000	22.000			24.000	24.000
1992 NOV	24.000	23.000	22.000			24.000	24.000

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

METALS									
BORON (UG/L)									
DET'N LIMIT = 2.00									
GUIDELINE = 5000 (A1)									
TREATMENT PLANT RAW	TREATMENT PLANT TREATED	TREATMENT PLANT	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING			
1991 FEB	24.000	24.000			26.000	26.000			
1991 APR	38.000	39.000	38.000	38.000	24.000	34.000			
1991 JUN	27.000	27.000	22.000	27.000	22.000	26.000			
1991 AUG	23.000	28.000	41.000	31.000					
1991 OCT	31.000	28.000	28.000	30.000	32.000	32.000			
1991 NOV	26.000	30.000	29.000	37.000	27.000	27.000			
1992 FEB	25.000	24.000			23.000	27.000			
1992 MAY	26.000	25.000	27.000	27.000					
1992 AUG	42.000	41.000			41.000	41.000			
1992 NOV	38.000	36.000	30.000	32.000					
BERYLLIUM (UG/L)									
DET'N LIMIT = 0.05									
GUIDELINE = 6800 (D4)									
1991 FEB	BOL	BOL			BOL	BOL			
1991 APR	BOL	BOL	BOL	BOL	BOL	BOL			
1991 JUN	BOL	BOL	BOL	BOL	BOL	BOL			
1991 AUG	.120 <T	.070 <T	.090 <T	.080 <T					
1991 OCT	BOL	BOL	BOL	BOL	BOL	.070 <T			
1991 NOV	BOL	BOL	BOL	BOL	BOL	BOL			
1992 FEB	.140 <T	.100 <T			.100 <T	.110 <T			
1992 MAY	BOL	BOL	BOL	BOL					
1992 AUG	BOL	BOL			.080 <T	.060 <T			
1992 NOV	BOL	BOL	BOL	BOL					
CADMIUM (UG/L)									
DET'N LIMIT = 0.05									
GUIDELINE = 5.0 (A1)									
1991 FEB	.060 <T	.060 <T	.090 <T		BOL	BOL			
1991 APR	BOL	BOL	BOL	BOL	BOL	BOL			
1991 JUN	BOL	BOL	BOL	BOL	BOL	BOL			
1991 AUG	BOL	BOL	BOL	.070 <T					
1991 OCT	BOL	BOL	BOL	BOL	BOL	BOL			
1991 NOV	.070 <T	.080 <T	.290 <T	3.100	.060 <T	.060 <T			
1992 FEB	.070 <T	.060 <T	.060 <T	.760	BOL	.060 <T			
1992 MAY	BOL	.060 <T	.070 <T		BOL	BOL			
1992 AUG	BOL	BOL	BOL	.060 <T					
1992 NOV	BOL	BOL	BOL	.060 <T					

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED		DIST. SYSTEM LABURNHAM AVE		DIST. SYSTEM LABURNHAM AVE		DIST. SYSTEM NORDIN AVE		DIST. SYSTEM NORDIN AVE	
				FREE FLOW		STANDING		FREE FLOW		STANDING	
METALS											
COBALT (UG/L)		DET'N LIMIT = 0.02		GUIDELINE = N/A							
1991 FEB	.190 <T	.240 <T		.130 <T		BOL		.100 <T		.150 <T	
1991 APR	.060 <T	BOL		.090 <T		.120 <T		BOL		.040 <T	
1991 JUN	.070 <T	.120 <T		.070 <T		.220 <T		.070 <T		.110 <T	
1991 AUG	.130 <T	.090 <T		.110 <T		.220 <T		.110 <T		.110 <T	
1991 OCT	.120 <T	.100 <T		.110 <T		.220 <T		.070 <T		.700 <T	
1991 NOV	.100 <T	.110 <T		.080 <T		.150 <T		.150 <T		.130 <T	
1992 FEB	.120 <T	.110 <T									
1992 MAY	.070 <T	.080 <T		.090 <T		.070 <T		.160 <T		.140 <T	
1992 AUG	.270 <T	.200 <T		.320 <T		.130 <T					
1992 NOV	.250 <T	.150 <T									
CHROMIUM (UG/L)		DET'N LIMIT = 0.50		GUIDELINE = 50.0 (A1)							
1991 FEB	1.100 <T	.880 <T		3.800 <T		3.600 <T		1.700 <T		1.600 <T	
1991 APR	4.200 <T	4.200 <T		1.500 <T		2.900 <T		.870 <T		2.900 <T	
1991 JUN	3.400 <T	3.200 <T		2.800 <T		1.900 <T		.770 <T		2.600 <T	
1991 AUG	.850 <T	1.600 <T		2.000 <T		2.800 <T		3.400 <T		3.400 <T	
1991 OCT	3.200 <T	2.100 <T		2.100 <T		2.100 <T		1.100 <T		.820 <T	
1991 NOV	.910 <T	2.100 <T		1.400 <T		2.100 <T		.650 <T		1.000 <T	
1992 FEB	BOL	.900 <T				1.500 <T					
1992 MAY	1.500 <T	1.600 <T		1.500 <T				2.700 <T		2.700 <T	
1992 AUG	2.600 <T	2.800 <T		2.600 <T		2.800 <T					
1992 NOV	5.200	4.600 <T									
COPPER (UG/L)		DET'N LIMIT = 0.50		GUIDELINE = 1000 (A3)							
1991 FEB	1.300 <T	2.200 <T		8.300		7.100		5.300		28.000	
1991 APR	1.200 <T	1.800 <T		3.900 <T		38.000		5.400		58.000	
1991 JUN	1.200 <T	1.800 <T		4.000 <T		34.000		5.100		37.000	
1991 AUG	1.100 <T	1.900 <T		2.600 <T		6.800					
1991 OCT	1.200 <T	1.800 <T		5.000 <T		42.000		3.200 <T		18.000	
1991 NOV	1.100 <T	2.200 <T						4.300 <T		15.000	
1992 FEB	1.700 <T	3.200 <T		3.500 <T		31.000		3.800 <T		18.000	
1992 MAY	1.300 <T	2.200 <T									
1992 AUG	1.300 <T	2.000 <T		1.900 <T		4.400 <T		2.900 <T		10.000	
1992 NOV	1.800 <T	3.600 <T									

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED		DIST. SYSTEM LABURNHAM AVE FREE FLOW		DIST. SYSTEM LABURNHAM AVE STANDING		DIST. SYSTEM NORDIN AVE FREE FLOW		DIST. SYSTEM NORDIN AVE STANDING	
METALS											
IRON (UG/L)		DET'N LIMIT = 6.00				GUIDELINE = 300 (A3)					
1991 FEB	34,000 <T	6,900 <T		69,000		31,000 <T		21,000 <T		19,000 <T	
1991 APR	69,000	BDL		8,700 <T		33,000 <T		32,000 <T		35,000 <T	
1991 JUN	20,000 <T	BDL		BDL		89,000		12,000 <T		13,000 <T	
1991 AUG	18,000 <T	BDL		BDL		58,000 <T		22,000 <T		20,000 <T	
1991 OCT	12,000 <T	BDL		BDL		69,000		19,000 <T		18,000 <T	
1991 NOV	18,000 <T	BDL		11,000 <T				16,000 <T		17,000 <T	
1992 FEB	18,000 <T	17,000 <T		11,000 <T		16,000 <T					
1992 MAY	14,000 <T	BDL		24,000 <T		32,000 <T		14,000 <T		17,000 <T	
1992 AUG	19,000 <T	BDL									
1992 NOV	180,000	21,000 <T									
MERCURY (UG/L)		DET'N LIMIT = 0.02				GUIDELINE = 1.0 (A1)					
1991 FEB	BDL	BDL		*	*	*	*	*	*	*	*
1991 APR	BDL	BDL		*	*	*	*	*	*	*	*
1991 JUN	BDL	BDL		*	*	*	*	*	*	*	*
1991 AUG	BDL	BDL		*	*	*	*	*	*	*	*
1991 OCT	BDL	BDL		*	*	*	*	*	*	*	*
1991 NOV	BDL	.040 <T		*	*	*	*	*	*	*	*
1992 FEB	BDL	BDL		*	*	*	*	*	*	*	*
1992 MAY	BDL	BDL		*	*	*	*	*	*	*	*
1992 AUG	BDL	BDL		*	*	*	*	*	*	*	*
1992 NOV	BDL	BDL		*	*	*	*	*	*	*	*
MANGANESE (UG/L)		DET'N LIMIT = 0.05				GUIDELINE = 50.0 (A3)					
1991 FEB	2,900	1,100		*	*	*	*	1,900		1,900	
1991 APR	5,200	.970		2,300		1,900		2,500		2,700	
1991 JUN	2,600	.610		1,100		1,800		1,800		2,000	
1991 AUG	2,000	.370 <T		.800		2,800		*		*	
1991 OCT	1,900	.600		390 <T		1,800		2,100		2,400	
1991 NOV	1,800	.500 <T		.790		2,100		1,600		2,200	
1992 FEB	1,900	.620		.900				1,600		1,500	
1992 MAY	1,900	.460 <T				1,300					
1992 AUG	2,000	.650		1,500		2,500		2,500		2,900	
1992 NOV	9,100	4,300						*		*	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

METALS						
MOLYBDENUM (UG/L)						
TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING	
		DET'N LIMIT = 0.05		GUIDELINE = N/A		
1991 FEB	1.100	1.200		1.200	1.100	
1991 APR	1.200	1.400	1.200	1.300	1.200	
1991 JUN	1.100	1.200	1.200	1.200	1.200	
1991 AUG	1.000	1.400	1.100			
1991 OCT	1.300	1.300	1.200	1.200	1.200	
1991 NOV	1.200	1.300	1.300	1.300	1.300	
1992 FEB	.280 <T	.670 <T		.380 <T	.640	
1992 MAY	.500 <T	.310 <T	.730	.450 <T		
1992 AUG	1.200	1.300		1.200	1.200	
1992 NOV	.950	1.200	1.300			
		DET'N LIMIT = 0.20		GUIDELINE = 350 (03)		
1991 FEB	1.800 <T	2.100		1.100 <T	1.500 <T	
1991 APR	1.300 <T	1.100 <T	86.000 RRV	1.100 <T	2.400	
1991 JUN	.820 <T	1.100 <T	1.200 <T	1.200 <T	2.000 <T	
1991 AUG	1.700 <T	1.400 <T	1.300 <T	14.000		
1991 OCT	1.400 <T	1.400 <T	1.500 <T	1.500 <T	2.000 <T	
1991 NOV	.860 <T	.940 <T	.720 <T	8.400	1.300 <T	
1992 FEB	1.300 <T	1.700 <T			2.300	
1992 MAY	BOL	BOL		.320 <T		
1992 AUG	1.200 <T	1.500 <T		1.100 <T	1.200 <T	
1992 NOV	1.300 <T	.800 <T	.850 <T	.870 <T		
		DET'N LIMIT = 0.05		GUIDELINE = 10 (A1)		
1991 FEB	.180 <T	BOL			1.700	
1991 APR	.160 <T	BOL	14.000 RRV	.480 <T	4.800	
1991 JUN	.100 <T	BOL	9.800	.460 <T	4.700	
1991 AUG	.090 <T	BOL	2.900			
1991 OCT	.090 <T	BOL	4.200	32.000		
1991 NOV	.110 <T	.090 <T	13.000 RRV	33.000	1.100	
1992 FEB	.190 <T	.140 <T		77.000	.970	
1992 MAY	.100 <T	.130 <T	8.700	12.000	.420 <T	
1992 AUG	.110 <T	.100 <T				
1992 NOV	.560	.130 <T	6.400	12.000	.440 <T	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
METALS					
ANTIMONY (UG/L)					
		DET'N LIMIT = 0.05		GUIDELINE = 146 (D4)	
1991 FEB	.500 <T	.470 <T		.660	.660
1991 APR	.680	.550	.810	.750	.650
1991 JUN	.670	.650	.590	.800	.770
1991 AUG	.510	.470 <T	.510	.690	
1991 OCT	.790	.560	.740	1.200	.830
1991 NOV	.770	.680	.610	.980	.890
1992 FEB	.650	.480 <T		.810	.550
1992 MAY	.580	.660	.820	.810	.560
1992 AUG	.430 <T	.400 <T		.540	
1992 NOV	.580	.570	1.200	.680	
SELENIUM (UG/L)					
		DET'N LIMIT = 1.00		GUIDELINE = 10 (A1)	
1991 FEB	BDL	BDL			BDL
1991 APR	BDL	1.100 <T	.810	1.500 <T	1.500 <T
1991 JUN	BDL	BDL	BDL	1.600 <T	BDL
1991 AUG	BDL	BDL	BDL	BDL	
1991 OCT	BDL	1.400 <T	1.600 <T	1.300 <T	1.400 <T
1991 NOV	BDL	1.300 <T	BDL	BDL	1.200 <T
1992 FEB	1.500 <T	1.500 <T		BDL	1.200 <T
1992 MAY	BDL	BDL	.810	BDL	2.400 <T
1992 AUG	BDL	2.000 <T			
1992 NOV	1.500 <T	1.500 <T	2.700 <T	2.600 <T	
STRONTIUM (UG/L)					
		DET'N LIMIT = 0.10		GUIDELINE = N/A	
1991 FEB	180.000	180.000		180.000	180.000
1991 APR	180.000	180.000	180.000	180.000	190.000
1991 JUN	170.000	170.000	180.000	170.000	180.000
1991 AUG	180.000	180.000	180.000		
1991 OCT	170.000	170.000	180.000	170.000	180.000
1991 NOV	190.000	180.000	180.000	190.000	180.000
1992 FEB	180.000	180.000		180.000	
1992 MAY	180.000	180.000	180.000		
1992 AUG	190.000	190.000		190.000	190.000
1992 NOV	180.000	180.000	190.000	190.000	190.000

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED		DIST. SYSTEM LABURNHAM AVE FREE FLOW		DIST. SYSTEM LABURNHAM AVE STANDING		DIST. SYSTEM NORDIN AVE FREE FLOW		DIST. SYSTEM NORDIN AVE STANDING	
METALS											
TITANIUM (UG/L)											
DET'N LIMIT = 0.50											
GUIDELINE = N/A											
1991 FEB	2,300 <T	2,200 <T	3,800 <T	3,000 <T	1,800 <T	1,800 <T	1,700 <T				
1991 APR	4,400 <T	3,100 <T	1,800 <T	1,900 <T	3,400 <T	3,400 <T	3,400 <T				
1991 JUN	1,800 <T	1,800 <T	1,700 <T	1,300 <T	1,800 <T	1,800 <T	2,000 <T				
1991 AUG	1,800 <T	1,600 <T	1,700 <T	1,300 <T	1,300 <T	1,300 <T	1,600 <T				
1991 OCT	1,100 <T	1,400 <T	1,300 <T	1,300 <T	1,300 <T	1,300 <T	1,500 <T				
1991 NOV	1,300 <T	1,500 <T	1,500 <T	1,800 <T	BDL	BDL	BDL				
1992 FEB	1,200 <T	1,600 <T	1,100 <T	1,000 <T	5,100	5,100	5,000 <T				
1992 MAY	830 <T	1,100 <T	1,300 <T	1,500 <T							
1992 AUG	5,600	4,900 <T									
1992 NOV	2,500 <T	2,200 <T									
THALLIUM (UG/L)											
DET'N LIMIT = 0.05											
GUIDELINE = 13 (04)											
48 SAMPLES											
BDL											
URANIUM (UG/L)											
DET'N LIMIT = 0.05											
GUIDELINE = 100 (A1)											
1991 FEB	310 <T	370 <T	350 <T	310 <T	370 <T	410 <T	370 <T				
1991 APR	290 <T	330 <T	280 <T	240 <T	290 <T	290 <T	350 <T				
1991 JUN	250 <T	270 <T	340 <T	290 <T	360 <T	360 <T	390 <T				
1991 AUG	310 <T	280 <T	410 <T	410 <T	330 <T	330 <T	360 <T				
1991 OCT	300 <T	370 <T	370 <T	400 <T	250 <T	250 <T	350 <T				
1991 NOV	350 <T	350 <T	370 <T	340 <T	300 <T	300 <T	300 <T				
1992 FEB	150 <T	250 <T	280 <T	280 <T	320 <T	320 <T					
1992 MAY	250 <T	260 <T									
1992 AUG	210 <T	170 <T									
1992 NOV	330 <T										
VANADIUM (UG/L)											
DET'N LIMIT = 0.05											
GUIDELINE = N/A											
1991 FEB	150 <T	090 <T	100 <T	100 <T	170 <T	170 <T	210 <T				
1991 APR	190 <T	110 <T	190 <T	240 <T	090 <T	090 <T	090 <T				
1991 JUN	BDL	300 <T	400 <T	460 <T	380 <T	380 <T	430 <T				
1991 AUG	250 <T	470 <T	350 <T	360 <T	BDL	BDL	BDL				
1991 OCT	250 <T	350 <T	BDL	130 <T							
1991 NOV	BDL	090 <T	BDL	BDL							
1992 FEB	BDL	060 <T	BDL	BDL							
1992 MAY	BDL	270 <T	440 <T	440 <T							
1992 AUG	270 <T	380 <T	220 <T	200 <T							
1992 NOV	400 <T										

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

ZINC (UG/L)	TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DET'N LIMIT = 0.20				GUIDELINE = 5000 (A3)			
			DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING				
METALS										
1991 FEB	3.600	2.800								
1991 APR	2.900	2.300	16.000	11.000	4.000	15.000				
1991 JUN	2.700	2.400	6.900	56.000	5.100	59.000				
1991 AUG	1.300 <T	1.400 <T	1.900 <T	52.000						
1991 OCT	1.200 <T	1.100 <T	1.600 <T	11.000	2.200	18.000				
1991 NOV	2.800	2.500	7.500	75.000	4.500	10.000				
1992 FEB	1.700 <T	4.600			5.000	13.000				
1992 MAY	1.500 <T	2.500	4.600	94.000						
1992 AUG	2.800	5.600			3.800	9.200				
1992 NOV	3.600	2.100	1.900 <T	5.600						

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
CHLOROAROMATICS					
HEXACHLOROBUTADIENE (NG/L)		DET'N LIMIT = 1,000		GUIDELINE = 450 (D4)	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL
123-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5,000		GUIDELINE = N/A	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL
1234-TETCHLOROBENZENE (NG/L)		DET'N LIMIT = 1,000		GUIDELINE = N/A	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL
1235-TETCHLOROBENZENE (NG/L)		DET'N LIMIT = 1,000		GUIDELINE = N/A	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL
124-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5,000		GUIDELINE = 10000 (I)	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL
1245-TETCHLOROBENZENE (NG/L)		DET'N LIMIT = 1,000		GUIDELINE = 38000 (D4)	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL
135-TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5,000		GUIDELINE = N/A	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL
HEXACHLOROBENZENE (NG/L)		DET'N LIMIT = 1,000		GUIDELINE = 10 (C1)	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL
HEXACHLOROETHANE (NG/L)		DET'N LIMIT = 1,000		GUIDELINE = 1900 (D4)	
1991 FEB	BOL	BOL	BOL	BOL	BOL
1991 APR	BOL	4,000 <T	3,000 <T	7,000 <T	BOL
1991 JUN	BOL	4,000 <T	13,000	36,000	BOL
1991 AUG	1AW	1AW	1AW	BOL	BOL
1991 OCT	BOL	BOL	BOL	2,000 <T	BOL
1991 NOV	BOL	BOL	BOL	5,000 <T	BOL
1992 FEB	BOL	BOL	BOL	BOL	BOL
1992 MAY	BOL	9,000 <T	2,000 <T	BOL	BOL
1992 AUG	BOL	2,000 <T	2,000 <T	BOL	BOL
1992 NOV	BOL	BOL	BOL	BOL	BOL
OCTACHLOROSTYRENE (NG/L)		DET'N LIMIT = 1,000		GUIDELINE = N/A	
31 SAMPLES	BOL	BOL	BOL	BOL	BOL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
CHLOROAROMATICS					
PENTACHLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 74000 (D4)	
31 SAMPLES	BDL	BDL		BDL	
236-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
31 SAMPLES	BDL	BDL		BDL	
245-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
31 SAMPLES	BDL	BDL		BDL	
26A-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
31 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NOROIN AVE FREE FLOW	DIST. SYSTEM NOROIN AVE STANDING
CHLOROPHENOLS					
234-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = N/A	
2 SAMPLES	BDL				
2345-TETCHLOROPHENOL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
2 SAMPLES	BDL				
2356-TETCHLOROPHENOL (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
2 SAMPLES	BDL				
245-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 2600000 (04)	
2 SAMPLES	BDL				
246-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 5000 (A1)	
2 SAMPLES	BDL				
PENTACHLOROPHENOL (NG/L)		DET'N LIMIT = 10.00		GUIDELINE = 60000 (A1)	
2 SAMPLES	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
PESTICIDES & PCB					
ALDRIN (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 700 (A1)	
31 SAMPLES	BOL	BOL		BOL	
ALPHA BHC (NG/L)					
		DET'N LIMIT = 1.000		GUIDELINE = 700 (G)	
1991 FEB	2.000 <T	1.000 <T		1.000 <T	
1991 APR	BOL	2.000 <T		3.000 <T	
1991 JUN	BOL	BOL		BOL	
1991 AUG	1AW	1AW			
1991 OCT	BOL	BOL		2.000 <T	
1991 NOV	BOL	BOL		2.000 <T	
1992 FEB	1.000 <T	BOL		1.000 <T	
1992 MAY	BOL	10.000 <T			
1992 AUG	BOL	BOL		BOL	
1992 NOV	1.000 <T	1.000 <T			
BETA BHC (NG/L)					
		DET'N LIMIT = 1.000		GUIDELINE = 300 (G)	
31 SAMPLES	BOL	BOL		BOL	
LINDANE (GAMMA BHC) (NG/L)					
		DET'N LIMIT = 1.000		GUIDELINE = 4000 (A1)	
31 SAMPLES	BOL	BOL		BOL	
ALPHA CHLORDANE (NG/L)					
		DET'N LIMIT = 2.000		GUIDELINE = 7000 (A1)	
31 SAMPLES	BOL	BOL		BOL	
GAMMA CHLORDANE (NG/L)					
		DET'N LIMIT = 2.000		GUIDELINE = 7000 (A1)	
31 SAMPLES	BOL	BOL		BOL	
DIELDRIN (NG/L)					
		DET'N LIMIT = 2.000		GUIDELINE = 700 (A1)	
31 SAMPLES	BOL	BOL		BOL	
METHOXYCHLOR (NG/L)					
		DET'N LIMIT = 5.0		GUIDELINE = 900000 (A1)	
31 SAMPLES	BOL	BOL		BOL	
ENDOSULFAN I (NG/L)					
		DET'N LIMIT = 2.000		GUIDELINE = 74000 (D4)	
31 SAMPLES	BOL	BOL		BOL	
ENDOSULFAN II (NG/L)					
		DET'N LIMIT = 5.000		GUIDELINE = 74000 (D4)	
31 SAMPLES	BOL	BOL		BOL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW STANDING	DIST. SYSTEM LABURNHAM AVE FREE FLOW STANDING	DIST. SYSTEM NORDIN AVE STANDING
PESTICIDES & PCB				
ENDRIN (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 1600 (D3)	
31 SAMPLES	BDL	BDL		BDL
ENDOSULFAN SULPHATE (NG/L)		DET'N LIMIT = 5.00	GUIDELINE = N/A	
31 SAMPLES	BDL	BDL		BDL
HEPTACHLOR EPOXIDE (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 3000 (A1)	
20 SAMPLES	BDL	BDL		BDL
HEPTACHLOR (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 3000 (A1)	
31 SAMPLES	BDL	BDL		BDL
MIREX (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = N/A	
31 SAMPLES	BDL	BDL		BDL
OXYCHLORDANE (NG/L)		DET'N LIMIT = 2.000	GUIDELINE = N/A	
31 SAMPLES	BDL	BDL		BDL
O,P-DDT (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)	
31 SAMPLES	BDL	BDL		BDL
PCB (NG/L)		DET'N LIMIT = 20.00	GUIDELINE = 3000 (A2)	
31 SAMPLES	BDL	BDL		BDL
P,P-DDD (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)	
31 SAMPLES	BDL	BDL		BDL
P,P-DDE (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 30000 (A1)	
31 SAMPLES	BDL	BDL		BDL
P,P-DDT (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)	
31 SAMPLES	BDL	BDL		BDL
TOWAPHENE (NG/L)		DET'N LIMIT = 500.0	GUIDELINE = 5000 (A1)	
28 SAMPLES	BDL	BDL		BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE STANDING
PESTICIDES & PCB				
AMETRINE (NG/L)		DET'N LIMIT = 50.0	GUIDELINE = 300000 (D3)	
16 SAMPLES	BDL			
ATRAZINE (NG/L)				
		DET'N LIMIT = 50.0	GUIDELINE = 60000 (A2)	
1991 FEB	200.000 <T			
1991 APR	140.000 <T			
1991 JUN	BDL			
1991 AUG	IAW			
1991 OCT	IAW			
1991 NOV	130.000 <T			
1992 FEB	110.000 <T			
1992 MAY	120.000 <T			
1992 AUG	90.000 <T			
1992 NOV	140.000 <T			
ATRATONE (NG/L)		DET'N LIMIT = 50.0	GUIDELINE = N/A	
16 SAMPLES	BDL			
CYANAZINE (BLADEX) (NG/L)				
		DET'N LIMIT = 100.0	GUIDELINE = 10000 (A2)	
14 SAMPLES	BDL			
DESETHYL ATRAZINE (NG/L)				
		DET'N LIMIT = 200.0	GUIDELINE = 60000 (A2)	
14 SAMPLES	BDL			
DESETHYL SIMAZINE (NG/L)				
		DET'N LIMIT = 200.0	GUIDELINE = 10000 (A2)	
16 SAMPLES	BDL			
PROMETONE (NG/L)				
		DET'N LIMIT = 50.000	GUIDELINE = 52500 (D3)	
14 SAMPLES	BDL			
PROPACINE (NG/L)				
		DET'N LIMIT = 50.000	GUIDELINE = 700000 (D3)	
14 SAMPLES	BDL			
PROMETRYNE (NG/L)				
		DET'N LIMIT = 50.000	GUIDELINE = 1000 (A2)	
16 SAMPLES	BDL			
METRIBUZIN (SENCOR) (NG/L)				
		DET'N LIMIT = 100.0	GUIDELINE = 80000 (A1)	
14 SAMPLES	BDL			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
PESTICIDES & PCB					
SIMAZINE (NG/L)		DET'N LIMIT = 50.00		GUIDELINE = 10000 (A2)	
14 SAMPLES	BDL		BDL		
ALACHLOR (LASSO) (NG/L)					
		DET'N LIMIT = 500.0		GUIDELINE = 5000 (A2)	
14 SAMPLES	BDL		BDL		
METOLACHLOR (NG/L)					
		DET'N LIMIT = 500.0		GUIDELINE = 50000 (A2)	
16 SAMPLES	BDL		BDL		
HEXACHYCLOPENTADIEN (NG/L)					
		DET'N LIMIT = 5.00		GUIDELINE = 206000 (D4)	
1991 FEB	BDL		BDL		BDL
1991 APR	BDL	16,000 <T	BDL	19,000 <T	BDL
1991 JUN	BDL	BDL	BDL	BDL	BDL
1991 AUG	1AW	1AW	1AW		
1991 OCT	BDL	16,000 <T	14,000 <T		BDL
1991 NOV	BDL	BDL	BDL		BDL
1992 FEB	BDL	1QU			BDL
1992 MAY	1QU	1QU	1QU		1QU
1992 AUG	1QU	1QU	1QU		1QU
1992 NOV	1QU	1QU	1QU		1QU

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW		DIST. SYSTEM LABURNHAM AVE STANDING		DIST. SYSTEM NORDIN AVE FREE FLOW		DIST. SYSTEM NORDIN AVE STANDING		
PHENOLICS											
PHENOLICS (UG/L)				DET'N LIMIT =		0.2		GUIDELINE = N/A			
1991 FEB	BDL		.400 <T								
1991 APR	BDL		.400 <T								
1991 JUN	1,200		.800 <T								
1991 AUG	.200 <T		.600 <T								
1991 OCT	BDL		BDL								
1991 NOV	.400 <T		.800 <T								
1992 FEB	BDL		.400 <T								
1992 MAY	BDL		1,200								
1992 AUG	BDL		1,000 <T								
1992 NOV	BDL		BDL								

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
POLYAROMATIC HYDROCARBONS					
PHENANTHRENE (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
ANTHRACENE (NG/L)		DET'N LIMIT = 1.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
FLUORANTHENE (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 42000 (04)	
15 SAMPLES	BDL	BDL		BDL	
PYRENE (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
BENZO(A)ANTHRACENE (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
CHRYSENE (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
DIMETH. BENZ(A)ANTHR (NG/L)		DET'N LIMIT = 5.0		GUIDELINE = N/A	
12 SAMPLES	BDL	BDL		BDL	
BENZO(E) PYRENE (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
BENZO(B) FLUORANTHENE (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
PERYLENE (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
BENZO(K) FLUORANTHENE (NG/L)		DET'N LIMIT = 1.0		GUIDELINE = N/A	
15 SAMPLES	BDL	BDL		BDL	
BENZO(A) PYRENE (NG/L)		DET'N LIMIT = 5.0		GUIDELINE = 10 (A1)	
15 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM MORDIN AVE FREE FLOW	DIST. SYSTEM MORDIN AVE STANDING
POLYAROMATIC HYDROCARBONS					
BENZO(G,H,I) PERYLEN (NG/L)		DET'N LIMIT = 20.0	GUIDELINE = N/A		
15 SAMPLES	BDL	BDL		BDL	
DIBENZO(A,H) ANTHRAC (NG/L)		DET'N LIMIT = 10.0	GUIDELINE = N/A		
15 SAMPLES	BDL	BDL		BDL	
INDENOC(1,2,3-C,D) PY (NG/L)		DET'N LIMIT = 20.0	GUIDELINE = N/A		
15 SAMPLES	BDL	BDL		BDL	
BENZO(B) CHRYSENE (NG/L)		DET'N LIMIT = 2.0	GUIDELINE = N/A		
15 SAMPLES	BDL	BDL		BDL	
CORONENE (NG/L)		DET'N LIMIT = 10.0	GUIDELINE = N/A		
15 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
SPECIFIC PESTICIDES					
TOXAPHENE (NG/L)		DET'N LIMIT = 500.0		GUIDELINE = 5000 (A1)	
3 SAMPLES	BDL	BDL		BDL	
2,4,5-T (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 280000 (A1)	
2 SAMPLES	BDL				
2,4-D (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 100000 (A1)	
2 SAMPLES	BDL				
2,4-DB (NG/L)		DET'N LIMIT = 200.0		GUIDELINE = N/A	
2 SAMPLES	BDL				
2,4 D PROPIONIC ACID (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = N/A	
2 SAMPLES	BDL				
DICAMBA (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 120000 (A1)	
2 SAMPLES	BDL				
2,4,5-TP (SILVEX) (NG/L)		DET'N LIMIT = 20.00		GUIDELINE = 10000 (A1)	
2 SAMPLES	BDL				
CARBOFURAN (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 90000 (A1)	
2 SAMPLES	BDL				
CHLOROPHOPHAN (CIPC) (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 350000 (G)	
2 SAMPLES	BDL				
DIALATE (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = N/A	
2 SAMPLES	BDL				
EPTAM (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = N/A	
2 SAMPLES	BDL				
IPC (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = N/A	
2 SAMPLES	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
SPECIFIC PESTICIDES					
PROPOXUR (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 140000 (D3)	
2 SAMPLES	BDL		BDL		
CARBARYL (NG/L)		DET'N LIMIT = 200.0		GUIDELINE = 90000 (A1)	
2 SAMPLES	BDL		BDL		
BUTYLATE (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 245000 (D3)	
2 SAMPLES	BDL		BDL		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
VOLATILES					
BENZENE (UG/L)	BDL	DET'N LIMIT = 0.05	GUIDELINE = 5 (A1)	BDL	
34 SAMPLES	BDL	BDL		BDL	
TOUENE (UG/L)					
1991 FEB	BDL	.050 <T		BDL	
1991 APR	BDL	BDL		BDL	
1991 JUN	BDL	BDL		BDL	
1991 AUG	BDL	BDL		BDL	
1991 OCT	BDL	BDL		BDL	
1991 NOV	BDL	.150 <T		BDL	
1992 FEB	BDL	.200 <T		.050 <T	
1992 MAY	BDL	.100 <T		.050 <T	
1992 AUG	BDL	BDL		BDL	
1992 NOV	BDL	.050 <T		BDL	
ETHYLBENZENE (UG/L)					
1991 FEB	BDL	BDL		.050 <T	
1991 APR	BDL	BDL		BDL	
1991 JUN	BDL	BDL		BDL	
1991 AUG	BDL	.100 <T		BDL	
1991 OCT	BDL	.100 <T		.150 <T	
1991 NOV	BDL	.100 <T		.100 <T	
1992 FEB	BDL	.100 <T		.200 <T	
1992 MAY	BDL	.100 <T		.100 <T	
1992 AUG	BDL	.050 <T		BDL	
1992 NOV	BDL	BDL		BDL	
P-XYLENE (UG/L)					
1991 FEB	BDL	BDL		BDL	
1991 APR	BDL	BDL		BDL	
1991 JUN	BDL	BDL		BDL	
1991 AUG	BDL	.100 <T		BDL	
1991 OCT	BDL	.100 <T		.150 <T	
1991 NOV	BDL	.100 <T		.100 <T	
1992 FEB	BDL	.100 <T		.200 <T	
1992 MAY	BDL	.100 <T		.100 <T	
1992 AUG	BDL	.050 <T		BDL	
1992 NOV	BDL	BDL		BDL	
M-XYLENE (UG/L)					
1991 FEB	BDL	BDL		BDL	
1991 APR	BDL	BDL		BDL	
1991 JUN	BDL	BDL		BDL	
1991 AUG	BDL	.100 <T		BDL	
1991 OCT	BDL	.100 <T		.150 <T	
1991 NOV	BDL	.100 <T		.100 <T	
1992 FEB	BDL	.100 <T		.200 <T	
1992 MAY	BDL	.100 <T		.100 <T	
1992 AUG	BDL	.050 <T		BDL	
1992 NOV	BDL	BDL		BDL	
O-XYLENE (UG/L)					
1991 FEB	BDL	BDL		BDL	
1991 APR	BDL	BDL		BDL	
1991 JUN	BDL	BDL		BDL	
1991 AUG	BDL	.100 <T		BDL	
1991 OCT	BDL	.100 <T		.150 <T	
1991 NOV	BDL	.100 <T		.100 <T	
1992 FEB	BDL	.100 <T		.200 <T	
1992 MAY	BDL	.100 <T		.100 <T	
1992 AUG	BDL	.050 <T		BDL	
1992 NOV	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
VOLATILES					
STYRENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 100 (D1)	
1991 FEB	BDL				
1991 APR	BDL	.100 <T		.150 <T	
1991 JUN	BDL			.100 <T	
1991 AUG	BDL	.050 <T		BDL	
1991 OCT	BDL	.100 <T		.350 <T	
1991 NOV	BDL	.100 <T		.250 <T	
1992 FEB	BDL	.050 <T		.350 <T	
1992 MAY	BDL	.100 <T		.150 <T	
1992 AUG	BDL				
1992 NOV	BDL				
1,1-DICHLOROETHYLENE (UG/L)					
		DET'N LIMIT = 0.100		GUIDELINE = 7 (D1)	
34 SAMPLES	BDL			BDL	
METHYLENE CHLORIDE (UG/L)					
		DET'N LIMIT = 0.50		GUIDELINE = 50 (A1)	
34 SAMPLES	BDL			BDL	
T12-DICHLOROETHYLENE (UG/L)					
		DET'N LIMIT = 0.10		GUIDELINE = 70 (D1)	
34 SAMPLES	BDL			BDL	
1,1-DICHLOROETHANE (UG/L)					
		DET'N LIMIT = 0.100		GUIDELINE = N/A	
34 SAMPLES	BDL			BDL	
CHLOROFORM (UG/L)					
		DET'N LIMIT = 0.10		GUIDELINE = 350 (A1+)	
1991 FEB	BDL				
1991 APR	BDL			4.000	
1991 JUN	BDL	6.000		5.600	
1991 AUG	BDL	4.100		4.100	
1991 OCT	BDL	5.300			
1991 NOV	BDL	11.100		6.300	
1992 FEB	BDL	5.300		14.600	
1992 MAY	BDL	6.000		4.200	
1992 AUG	BDL	7.900		4.400	
1992 NOV	BDL	10.000			
	BDL	8.200		9.300	
111, TRICHLOROETHANE (UG/L)					
		DET'N LIMIT = 0.02		GUIDELINE = 200 (D1)	
34 SAMPLES	BDL			BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
VOLATILES					
1,2-DICHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5 (A1)	
34 SAMPLES	BDL	BDL	BDL	BDL	BDL
CARBON TETRACHLORIDE (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 5 (A1)	
1991 FEB	BDL	BDL	BDL	BDL	BDL
1991 APR	BDL	.200 <T	BDL	.200 <T	BDL
1991 JUN	BDL	BDL	BDL	BDL	BDL
1991 AUG	BDL	BDL	BDL	BDL	BDL
1991 OCT	BDL	BDL	BDL	BDL	BDL
1991 NOV	BDL	BDL	BDL	BDL	BDL
1992 FEB	BDL	BDL	BDL	BDL	BDL
1992 MAY	BDL	BDL	BDL	BDL	BDL
1992 AUG	BDL	BDL	BDL	BDL	BDL
1992 NOV	BDL	BDL	BDL	BDL	BDL
1,2-DICHLOROPROPANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5 (D1)	
34 SAMPLES	BDL	BDL	BDL	BDL	BDL
TRICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 50 (A1)	
34 SAMPLES	BDL	BDL	BDL	BDL	BDL
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 350 (A1+)	
1991 FEB	BDL	5.450	BDL	3.600	BDL
1991 APR	BDL	6.250	5.300	4.900	BDL
1991 JUN	BDL	5.700	3.600	3.700	BDL
1991 AUG	BDL	5.900	4.900	BDL	BDL
1991 OCT	BDL	10.400	7.500	5.600	BDL
1991 NOV	BDL	5.900	4.500	4.200	BDL
1992 FEB	BDL	6.850	BDL	4.300	BDL
1992 MAY	BDL	7.600	7.000	BDL	BDL
1992 AUG	BDL	8.300	7.750	7.400	BDL
1992 NOV	BDL	13.250	BDL	BDL	BDL
1,1,2-TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 0.6 (D4)	
34 SAMPLES	BDL	BDL	BDL	BDL	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM STANDING
VOLATILES					
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 350 (A1+)	
1991 FEB	BDL	2,900		2,700	
1991 APR	BDL	4,000		3,400	
1991 JUN	BDL	3,100		2,100	
1991 AUG	BDL	3,600			
1991 OCT	BDL	5,500		3,700	
1991 NOV	BDL	4,000		3,200	
1992 FEB	BDL	3,900		2,900	
1992 MAY	BDL	4,300			
1992 AUG	BDL	5,100		4,700	
1992 NOV	BDL	5,300			
TETRACHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 65 (A5)	
34 SAMPLES	BDL	BDL		BDL	
BROMOFORM (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 350 (A1+)	
1991 FEB	BDL	.600 <T		.400 <T	
1991 APR	BDL	.600 <T		.600 <T	
1991 JUN	BDL	.400 <T		BDL	
1991 AUG	BDL	.400 <T			
1991 OCT	BDL	.600 <T		.400 <T	
1991 NOV	BDL	.600 <T		.400 <T	
1992 FEB	BDL	.600 <T		BDL	
1992 MAY	BDL	BDL		BDL	
1992 AUG	BDL	1,000 <T		BDL	
1992 NOV	BDL	BDL			
1122-TECHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 0.17 (D4)	
34 SAMPLES	BDL	BDL		BDL	
VINYL CHLORIDE (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 2 (D1)	
12 SAMPLES	BDL	BDL		BDL	
C12-DICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 70 (D1)	
12 SAMPLES	BDL	BDL		BDL	
CHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 1510 (D3)	
34 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM FREE FLOW	DIST. SYSTEM STANDING	DIST. SYSTEM NORTH AVE FREE FLOW	DIST. SYSTEM NORTH AVE STANDING
VOLATILES					
1,4-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 5 (A1)		
34 SAMPLES	BDL	BDL	BDL		
1,3-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 3750 (03)		
34 SAMPLES	BDL	BDL	BDL		
1,2-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 200 (A1)		
34 SAMPLES	BDL	BDL	BDL		
ETHYLENE DIBROMIDE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 50 (01)		
34 SAMPLES	BDL	BDL	BDL		
TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = 0.50	GUIDELINE = 350 (A1)		
1991 FEB	BDL	14.050	10.800		
1991 APR	BDL	17.400	14.450		
1991 JUN	BDL	14.600	9.800		
1991 AUG	BDL	15.700	13.500		
1991 OCT	BDL	27.600	26.700		
1991 NOV	BDL	15.800	16.000		
1992 FEB	BDL	17.300	12.100		
1992 MAY	BDL	19.800	18.700		
1992 AUG	BDL	24.400	21.600		
1992 NOV	BDL	37.150	20.950		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 METRO TORONTO (R. L. CLARK) WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM LABURNHAM AVE FREE FLOW	DIST. SYSTEM LABURNHAM AVE STANDING	DIST. SYSTEM NORDIN AVE FREE FLOW	DIST. SYSTEM NORDIN AVE STANDING
RADIONUCLIDES					
COBALT 60 (Bq/L)		DET'N LIMIT = 0.70		GUIDELINE = N/A	
4 SAMPLES	BDL				
CESIUM 134 (Bq/L)		DET'N LIMIT = 0.70		GUIDELINE = N/A	
4 SAMPLES	BDL				
CESIUM 137 (Bq/L)		DET'N LIMIT = 0.70		GUIDELINE = 50 (A1)	
4 SAMPLES	BDL				
GROSS ALPHA COUNT (Bq/L)		DET'N LIMIT = 0.04		GUIDELINE = 0.55 (O1)	
4 SAMPLES	BDL				
GROSS BETA COUNT (Bq/L)		DET'N LIMIT = 0.04		GUIDELINE = N/A	
1991 JUN	.120				
1992 MAY	.090				
TRITIUM (Bq/L)		DET'N LIMIT = 7.00		GUIDELINE = 40000 (A1)	
1991 JUN	12.000				
1992 MAY	15.000				
IODINE 131 (Bq/L)		DET'N LIMIT = 0.70		GUIDELINE = 10 (A1)	
4 SAMPLES	BDL				

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	0 (A1)
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	0	500/ML (A3)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML (A1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	0	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	0	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	0	N/A
FIELD PH	DMNSLESS	N/A	6.5-8.5 (A4)
FIELD TEMPERATURE	DEG.C	N/A	15.0 (A3)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	0.20	30-500 (A4)
AMMONIUM TOTAL	MG/L	0.002	0.05 (F2)
CALCIUM	MG/L	0.20	100.0 (F2)
CHLORIDE	MG/L	0.20	250.0 (A3)
COLOUR	TCU	0.50	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.00	400.0 (F2)
CYANIDE	MG/L	0.001	0.2 (A1)
DISSOLVED ORGANIC CARBON	MG/L	0.10	5.0 (A3)
FLUORIDE	MG/L	0.01	1.5* (A1)
HARDNESS	MG/L	0.50	80-100 (A4)
IONCAL	DMNSLESS	N/A	N/A
LANGELIERS INDEX	DMNSLESS	N/A	N/A
MAGNESIUM	MG/L	0.10	30.0 (F2)
NITRATES (TOTAL)	MG/L	0.005	10.0 (A1)
NITRITE	MG/L	0.001	1.0 (A1)
NITROGEN TOTAL KJELDAHL	MG/L	0.02	N/A
PH	DMNSLESS	N/A	6.5-8.5 (A4)
PHOSPHORUS FIL REACT	MG/L	0.0005	N/A
PHOSPHORUS TOTAL	MG/L	0.002	0.4 (F2)
POTASSIUM	MG/L	0.010	10.0 (F2)
RESIDUE FILTRATE (CALCULATED TDS)	MG/L	N/A	500.0 (A3)
SODIUM	MG/L	0.20	200.0 (A4)
SULPHATE	MG/L	0.20	500.0 (A4)
TURBIDITY	FTU	0.05	1.0 (A1)
* The Maximum Acceptable Concentration (MAC) for <u>naturally occurring fluoride</u> in drinking water is 2.4 mg/L.			
CHLOROAROMATICS			
1,2,3-TRICHLOROBENZENE	NG/L	5.0	N/A
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.0	N/A
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.0	N/A
1,2,4-TRICHLOROBENZENE	NG/L	5.0	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.0	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.0	N/A
2,3,6-TRICHLOROTOLUENE	NG/L	5.0	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.0	N/A
2,6A-TRICHLOROTOLUENE	NG/L	5.0	N/A
HEXACHLOROBENZENE (HCB)	NG/L	1.0	10 (C1)
HEXACHLOROBUTADIENE	NG/L	1.0	450 (D4)
HEXACHLOROETHANE	NG/L	1.0	1900 (D4)
OCTACHLOROSTYRENE	NG/L	1.0	N/A
PENTACHLOROBENZENE	NG/L	1.0	74000 (D4)
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	100.0	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	20.0	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	10.0	N/A

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
2,4,5-TRICHLOROPHENOL	NG/L	100.0	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	20.0	5000 (A1)
PENTACHLOROPHENOL	NG/L	10.0	60000 (A1)
METALS			
ALUMINUM	UG/L	0.10	100 (A4)
ANTIMONY	UG/L	0.05	146 (D4)
ARSENIC	UG/L	0.10	25 (A1)
BARIUM	UG/L	0.05	1000 (A2)
BERYLLIUM	UG/L	0.05	6800 (D4)
BORON	UG/L	2.00	5000 (A1)
CADMIUM	UG/L	0.05	5 (A1)
CHROMIUM	UG/L	0.50	50 (A1)
COBALT	UG/L	0.02	N/A
COPPER	UG/L	0.50	1000 (A3)
IRON	UG/L	6.00	300 (A3)
LEAD	UG/L	0.05	10 (A1)
MANGANESE	UG/L	0.05	50 (A3)
MERCURY	UG/L	0.02	1 (A1)
MOLYBDENUM	UG/L	0.05	N/A
NICKEL	UG/L	0.20	350 (D3)
SELENIUM	UG/L	1.00	10 (A1)
SILVER	UG/L	0.05	N/A
STRONTIUM	UG/L	0.10	N/A
THALLIUM	UG/L	0.05	13 (D4)
TITANIUM	UG/L	0.50	N/A
URANIUM	UG/L	0.05	100 (A1)
VANADIUM	UG/L	0.05	N/A
ZINC	UG/L	0.20	5000 (A3)
POLYNUCLEAR AROMATIC HYDROCARBONS			
ANTHRACENE	NG/L	1.0	N/A
BENZO(A) ANTHRACENE	NG/L	20.0	N/A
BENZO(A) PYRENE	NG/L	5.0	10 (A1)
BENZO(B) CHRYSENE	NG/L	2.0	N/A
BENZO(B) FLUORANTHENE	NG/L	10.0	N/A
BENZO(E) PYRENE	NG/L	50.0	N/A
BENZO(G,H,I) PERYLENE	NG/L	20.0	N/A
BENZO(K) FLUORANTHENE	NG/L	1.0	N/A
CHRYSENE	NG/L	50.0	N/A
CORONENE	NG/L	10.0	N/A
DIBENZO(A,H) ANTHRACENE	NG/L	10.0	N/A
DIMETHYL BENZO(A) ANTHRACENE	NG/L	5.0	N/A
FLUORANTHENE	NG/L	20.0	42000 (D4)
INDENO(1,2,3-C,D) PYRENE	NG/L	20.0	N/A
PERYLENE	NG/L	10.0	N/A
PHENANTHRENE	NG/L	10.0	N/A
PYRENE	NG/L	20.0	N/A
PESTICIDES & PCB			
ALACHLOR (LASSO)	NG/L	500.0	5000 (A2)
ALDRIN	NG/L	1.0	700 (A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700 (G)
ALPHA CHLORDANE	NG/L	2.0	7000 (A1)
AMETRINE	NG/L	50.0	300000 (D3)
ATRATONE	NG/L	50.0	N/A
ATRAZINE	NG/L	50.0	60000 (A2)
DESETHYL ATRAZINE	NG/L	200.0	60000 (A2)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300 (G)
CYANAZINE (BLADEX)	NG/L	100.0	10000 (A2)
DIELDRIN	NG/L	2.0	700 (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000 (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	5.0	74000 (D4)
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	5.0	N/A

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
ENDRIN	NG/L	5.0	1600 (D3)
GAMMA CHLORDANE	NG/L	2.0	7000 (A1)
HEPTACHLOR	NG/L	1.0	3000 (A1)
HEPTACHLOR EPOXIDE	NG/L	1.0	3000 (A1)
HEXACHLOROCYCLOPENTADIENE	NG/L	5.0	206000 (D4)
LINDANE (GAMMA BHC)	NG/L	1.0	4000 (A1)
METHOXYCHLOR	NG/L	5.0	900000 (A1)
METOLACHLOR	NG/L	500.0	50000 (A2)
METRIBUZIN (SENCOR)	NG/L	100.0	80000 (A1)
MIREX	NG/L	5.0	N/A
P,P-DDD	NG/L	5.0	30000 (A1)
O,P-DDT	NG/L	5.0	30000 (A1)
P,P-DDT	NG/L	5.0	30000 (A1)
P,P-DDE	NG/L	1.0	30000 (A1)
OXYCHLORDANE	NG/L	2.0	N/A
PCB	NG/L	20.0	3000 (A2)
PROMETONE	NG/L	50.0	52500 (D3)
PROMETRYNE	NG/L	50.0	1000 (A2)
PROPACINE	NG/L	50.0	700000 (D3)
SIMAZINE	NG/L	50.0	10000 (A2)
DESETHYL SIMAZINE	NG/L	200.0	10000 (A2)
TOXAPHENE	NG/L	500.0	5000 (A1)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	0.2	N/A
SPECIFIC PESTICIDES			
2,4 D PROPIONIC ACID	NG/L	100.0	N/A
2,4,5-TRICHLOROPHENOXY ACETIC ACID	NG/L	50.0	280000 (A1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.0	100000 (A1)
2,4-DICHLOROPHENOXYBUTYRIC ACID (2,4-DB)	NG/L	200.0	N/A
2,4,5-TP (SILVEX)	NG/L	20.0	10000 (A1)
BUTYLATE (SUTAN)	NG/L	2000.0	245000 (D3)
CARBARYL (SEVIN)	NG/L	200.0	90000 (A1)
CARBOFURAN	NG/L	2000.0	90000 (A1)
CHLORPROPHAM (CIPC)	NG/L	2000.0	350000 (G)
CHLORPYRIFOS (DURSBN)	NG/L	20.0	N/A
DIALLATE	NG/L	2000.0	N/A
DIAZINON	NG/L	20.0	20000 (A1)
DICAMBA	NG/L	50.0	120000 (A1)
DICHLOROVOS	NG/L	20.0	N/A
EPTAM	NG/L	2000.0	N/A
ETHION	NG/L	20.0	35000 (G)
IPC	NG/L	2000.0	N/A
MALATHION	NG/L	20.0	190000 (A1)
METHYL PARATHION	NG/L	50.0	9000 (D3)
METHYLTRITHION	NG/L	20.0	N/A
MEVINPHOS	NG/L	20.0	N/A
PARATHION	NG/L	20.0	50000 (A1)
PHORATE (THIMET)	NG/L	20.0	2000 (A2)
PICHLORAM	NG/L	100.0	190000 (A2)
PROPOXUR (BAYGON)	NG/L	2000.0	140000 (D3)
RELDAN	NG/L	20.0	N/A
RONNEL	NG/L	20.0	N/A
VOLATILES			
1,1-DICHLOROETHANE	UG/L	0.10	N/A
1,1-DICHLOROETHYLENE	UG/L	0.10	7 (D1)
1,2-DICHLOROBENZENE	UG/L	0.05	200 (A1)
1,2-DICHLOROETHANE	UG/L	0.05	5 (A1)
1,2-DICHLOROPROPANE	UG/L	0.05	5 (D1)
1,3-DICHLOROBENZENE	UG/L	0.10	3750 (D3)
1,4-DICHLOROBENZENE	UG/L	0.10	5 (A1)
1,1,1-TRICHLOROETHANE	UG/L	0.02	200 (D1)
1,1,2-TRICHLOROETHANE	UG/L	0.05	0.6 (D4)
1,1,2,2-TETRACHLOROETHANE	UG/L	0.05	0.17 (D4)

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BENZENE	UG/L	0.05	5 (A1)
BROMOFORM	UG/L	0.20	350 (A1+)
CARBON TETRACHLORIDE	UG/L	0.20	5 (A1)
CHLOROBENZENE	UG/L	0.10	1510 (D3)
CHLORODIBROMOMETHANE	UG/L	0.10	350 (A1+)
CHLOROFORM	UG/L	0.10	350 (A1+)
CIS 1,2-DICHLOROETHYLENE	UG/L	0.10	70 (D1)
DICHLOROBROMOMETHANE	UG/L	0.05	350 (A1+)
ETHYLENE DIBROMIDE	UG/L	0.05	50 (D1)
ETHYLBENZENE	UG/L	0.05	2.4 (A3)
M-XYLENE	UG/L	0.10	300 (A3*)
METHYLENE CHLORIDE	UG/L	0.50	50 (A1)
O-XYLENE	UG/L	0.05	300 (A3*)
P-XYLENE	UG/L	0.10	300 (A3*)
STYRENE	UG/L	0.05	100 (D1)
TETRACHLOROETHYLENE	UG/L	0.05	65 (A5)
TRANS 1,2-DICHLOROETHYLENE	UG/L	0.10	70 (D1)
TOLUENE	UG/L	0.05	24 (A3)
TOTAL TRIHALOMETHANES	UG/L	0.50	350 (A1)
TRICHLOROETHYLENE	UG/L	0.10	50 (A1)
VINYL CHLORIDE	UG/L	0.10	2 (D1)
RADIONUCLIDES			
TRITIUM	BQ/L	7.0	40000 (A1)
GROSS ALPHA COUNT	BQ/L	0.04	0.55# (D1)
GROSS BETA COUNT	BQ/L	0.04	N/A
COBALT 60	BQ/L	0.70	N/A
CESIUM 134	BQ/L	0.70	N/A
CESIUM 137	BQ/L	0.70	50 (A1)
IODINE 131	BQ/L	0.70	10 (A1)

Equal to 15.0 Picocuries/litre

DRINKING WATER SURVEILLANCE PROGRAM
PROGRAM DESCRIPTION

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality;
- a flagging mechanism for guideline exceedance;
- a definition of contaminant levels and trends;
- a comprehensive background for remedial action;
- a framework for assessment of new contaminants; and
- an indication of treatment efficiency of plant processes.

PROGRAM

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. In 1992, 109 systems were being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analyzed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling, in order to acquire complete plant process and distribution system details and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of raw (ambient water) and treated water at the treatment plant and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled. Sampling is carried out by operational personnel who have been trained in applicable procedures.

Comprehensive standardized procedures and field test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". Most laboratory analyses are carried out by the Ministry of Environment and Energy (MOEE), Laboratory Services Branch. Radionuclides are analyzed by the Ministry of Labour.

DATA REPORTING MECHANISM

When the analytical results are transferred from the MOEE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOEE District Officer, the appropriate operational staff and are also retained by the DWSP unit.

PROGRAM INPUTS AND OUTPUTS

There are four major inputs and four major outputs in the program.

Program Input - Plant and Distribution System Description

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant visit. During the initial assessment of the plant and distribution system, questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The Plant and Distribution System Description consists of the following seven components:

1. PROCESS COMPONENT INVENTORY

All physical and chemical processes to which the water is subjected, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. TREATMENT CHEMICALS

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. Chemical dosages applied on the day of sampling are recorded in DWSP.

3. PROCESS CONTROL MEASUREMENTS

Documentation of in-plant monitoring of process parameters (eg. turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. Except for the recorded Field Data, in-plant monitoring results are not retained in DWSP but are retained by the water treatment plant personnel.

4. DESIGN FLOW AND RETENTION TIME

Hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. Maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. DISTRIBUTION SYSTEM DESCRIPTION

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. SAMPLING SYSTEM

Each plant is assessed for its adequacy in terms of the sampling of bacteriological, organic and inorganic parameters. Prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area; and
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. PERSONNEL

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate MOEE personnel associated with the plant.

Program Input - Field Data

The second major input to DWSP is field data. Field data is collected at the plant and from the distribution system sites on the day of sampling. Field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling, as well as, monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analyzed according to standardized DWSP protocols to allow for interplant comparison.

Program Input - Laboratory Analytical Data

The third major input to DWSP is Laboratory Analytical Data. Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. Parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list, but which may be of interest. The majority of parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyze, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and comparison data documented.

Program Input - Parameter Reference Information

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analyzed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database. An example is shown in figure 1.

Program output - Query

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOEE offices is being developed by the DWSP group.

Program Output - Action Alerts

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the Ontario Drinking Water Objectives publication. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, guidelines/limits from other agencies are used. The Parameter Listing System, published by MOEE (ISBN 0-7729-4461-X), catalogues and keeps current guidelines for 650 parameters from agencies throughout the world. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

Program Output - Report Generation

Custom reports can be generated from DWSP to meet MOEE Regional needs and to respond to public requests.

Program Output - Annual Reports

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG.1

PARAMETER REFERENCE INFORMATION

NAME: BENZENE

CAS#: 71-43-2

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 $\mu g/L$

SYNONYMS: BENZOL; BENZOLE; COAL NAPHTHA; CARBON OIL (27)
CYCLOHEXATRIENE (41)

CHARACTERISTICS: COLOURLESS TO LIGHT-YELLOW, MOBILE, NONPOLAR LIQUID, OF
HIGHLY REFRACTIVE NATURE, AROMATIC ODOUR; VAPOURS BURN
WITH SMOKING FLAME (30)

PROPERTIES: SOLUBILITY IN WATER: 1780-1800 mg/L AT 25C (41)
THRESHOLD ODOUR: 0.5 - 10 PPM IN WATER
THRESHOLD TASTE: 0.5 mg/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS
AND APPEARS TO ACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT
A HIGH LIPID CONTENT OR REPRESENT MAJOR METABOLIC SITES,
SUCH AS LIVER OR BRAIN; SMALL QUANTITIES EVAPORATE FROM
SOILS OR ARE DEGRADED RATHER QUICKLY (80)

SOURCES: COMMERCIAL: PETROLEUM REFINING; SOLVENT RECOVERY; COAL TAR
DISTILLATION (39); FOOD PROCESSING AND TANNING INDUSTRIES;
COMBUSTION OF CAR EXHAUST.
ENVIRONMENTAL: POSSIBLE SOURCE IS RUNOFF.

USES: DETERGENTS; NYLON; INTERMEDIATE IN PRODUCTION OF OTHER
COMPOUNDS, SUCH AS PESTICIDES; SOLVENT FOR EXTRACTION AND
RECTIFICATION IN RUBBER INDUSTRY; DEGREASING AND CLEANSING
AGENT; GASOLINE.

REMOVAL: THE FOLLOWING PROCESSES HAVE BEEN SUCCESSFUL IN REMOVING
BENZENE FROM WASTEWATER: GAC ADSORPTION, PRECIPITATION
WITH ALUM AND SUBSEQUENT REMOVAL VIA SEDIMENTATION,
COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION,
OXIDATION

ADDITIONAL PROPERTIES: MOLECULAR WEIGHT: 78.12
MELTING POINT: 5.5°C (27)
BOILING POINT: 80.1°C (27)
SPECIFIC GRAVITY: 0.8790 AT 20°C (27)
VAPOUR PRESSURE: 100 MM AT 26.1°C (27)
HENRY'S LAW CONSTANT: 0.00555 ATM-M³/MOLE (41)
LOG OCT./WATER PARTITION COEFFICIENT: 1.95 TO 2.13 (39)
CARBON ADSORPTION: K=1.0; 1/N=1.6; R=0.97; PH=5.3 (41)
SEDIMENT/WATER PARTITION COEFFICIENT: NO DATA

DWSP SAMPLING GUIDELINE

i) Raw and Treated at Plant

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-220 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (Caution: HNO_3 is corrosive)
Volatiles (duplicates) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle -fill bottle completely without bubbles
Organics (OWOC), (OWTRI)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Specific Pesticides (OWCP), (PEOP), (PECAR)	-as per Organics -three extra bottles must be filled
Polyaromatic hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate
Cyanide (Treated only)	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops sodium hydroxide (NaOH) (Caution: NaOH is corrosive)
Mercury	-250 mL glass bottle -rinse bottle and cap three times -fill to top of label -add 20 drops each nitric acid (HNO_3) - and potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) (Caution: HNO_3 & $\text{K}_2\text{Cr}_2\text{O}_7$ are corrosive)

Phenols	-250 mL glass bottle -do <u>not</u> rinse bottle, preservative has been added -fill to top of label
Radionuclides (as scheduled)	-4 L plastic jug -do <u>not</u> rinse, carrier added -fill to 5 cm from top
Organic Characterization (GC/MS - once per year) (PBVOL), (PBEXT)	-1 L amber glass bottle; instructions as per organic -250 mL glass bottle -do <u>not</u> rinse bottle -fill completely without bubbles

Steps:

1. Let sampling water tap run for an adequate time to clear the sample line.
2. Record time of day on submission sheet.
3. Record temperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.
6. No smoking in area of sample location.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Metals	-500 mL plastic bottle (PET 500). -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (Caution: HNO_3 is corrosive)

Steps:

1. Record time of day on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.

5. Fill general chemistry and metals bottles.

6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-250 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid HNO_3 (Caution: HNO_3 is corrosive)
Volatiles (duplicate) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle, preservative has been added -fill bottle completely without bubbles
Organics (OWOC)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Polyaromatic Hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate

Steps:

1. Record time of day on submission sheet.

2. Let cold water flow for five minutes.

3. Record temperature on submission sheet.

4. Fill all bottles as per instructions.

5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

